February 18, 1983

CD-83-2 (LD)

Dear Light-Duty Motor Vehicle Manufacturer:

Subject: Supplement to the 1984 Model Year Light-Duty Motor Vehicle Application Format

This letter transmits to you the Supplement to the Application Format for Certification of Light-Duty Motor Vehicles, 1984 Model Year, for the preparation and submission of certification data forms. Principal changes from the 1982 Data Supplement are the following:

Inclusion of the Certification Change Request Form, the Car/Truck Line Information System Data Sheet and the Special DF/CSPM Identifier Data Sheet

In order to reduce response time we have added the Certification Change Request Form, the Car/Truck Line Information Data Sheet and the Special DF/CSPM Identifier Data Sheet into the 1984 Supplement. Included are descriptions of error checks and illustrations of the reports generated by these systems.

New Fields on the VI Sheet

The 1984 Model Year Supplement documents the additions of Odometer Correction fields to Card 5, columns 42-52, a Transmission Modifier field to Card 5, columns 55-58 and a Shift Indicator Light field to Card 5, column 60 of the VI Sheet. The Transmission Configuration field is relocated to Card 5, columns 53-54.

Changes to the 1984 Supplement are summarized in the "Summary of Changes," located on pages 105 -108 of the enclosure.

Also included is the EPA Standardized Engine Family Name description with an updated manufacturer subcode table.

Sincerely yours,

Robert E. Maxwell, Director
Certification Branch
Office of Mobile Sources

Enclosure

APPLICATION FORMAT

FOR

CERTIFICATION OF

LIGHT-DUTY MOTOR VEHICLES

-1984 MODEL YEAR-

Supplement on Preparation

and Submission of

Certification Data Forms

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I. GENERAL INSTRUCTIONS

All data used during the light-duty motor vehicle certification process are of two types: "hard-copy" data--the typed, drawn, or handwritten portions of the applications which are manually reviewed by the certification engineers--and "machine-readable" or "computer-compatible" data--information which is stored, processed, and manipulated by OMS's computer system. All computer-compatible material is currently entered into the Light-Duty Motor Vehicle Data Base to support several crucial functions, including, MVEL test processing, collection (in a uniform, electronically analyzable format) of test vehicle information needed for certification, collection of information needed to plan EPA audits, provision of important input to the fuel economy program, and preparation of the certification test data summary required by the Clean Air Act.

Beginning with the 1981 Model Year, EPA has issued detailed instructions for the preparation and submission of these machine-readable data as a supplement to the Application Format for Certification of Light-Duty Motor Vehicles. Like the application format itself, this supplement is updated annually; the recommendations of this version are effective immediately and apply to all Model Year 1984 submissions of Certification Division data forms or their machine-readable equivalents.

A. The Data Input Forms and Their Functions

The input data sheets used for the 1984 model year, and which industry is asked to prepare, are the following:

1. Engine-System Information Sheet (ESI Sheet)

The ESI Sheet provides EPA with summary information for each engine-system combination that a manufacturer intends to certify. By alerting EPA to the development of new engines, control systems, etc., the ESI data enable EPA to plan its auditing activities effectively. Furthermore, the ESI sheet "registers" an engine-system combination into the data base, so that additional data on this combination can be entered into EPA's computer system.

2. Vehicle Information Data Sheet (VI Sheet)

The VI Sheet conveys to the data base a partial description of a vehicle used for certification and/or fuel economy testing. As the Model Year 1984 Application Format indicates, a completed VI Sheet is one component of a Vehicle Book; VI Sheets should also be prepared when fuel economy data vehicle packages are assembled, when vehicles (and their data) are submitted for carryover/carry-across, or when vehicles are built or reconfigured for running change/field fix testing.

3. Manufacturer's Test Data Sheet (MTDS)

The MTDS is used to enter the results of all emission and fuel economy tests performed by the manufacturer into the EPA data base.

4. summary Sheet Input Form (SSF)

This sheet is used to enter into the computer the information needed to generate a "Summary Sheet", which includes a concise description of all test vehicles, test results, and procedures used to support the issuance of each certificate of conformity, together with a list of all car lines covered by the particular certificate.

5. Certification Change Request Form (CCRF)

The CCRF is used to specify running changes, field fixes, and addition of models to the EPA data base.

6. Car/Truck Line Information Sheet

The Car/Truck Line Information Sheet is used to identify models and class codes with interior volume information.

7. Special DF/CSPM Identifier Sheet

The Special DF/CSPM Identifier Sheet is used to enter special calculation deterioration factors and the Cold Start Program Modifier (CSPM) trip point mileage into the EPA data base.

B. Definitions

The following definitions will be used throughout this document.

Card. One line of an EPA data input sheet, corresponding in general format to a standard 80-column, 12-punch-position, computer punchcard. Each data sheet consists of several cards which differ in structure and data content. Each distinct card type is labeled with a different number or letter to identify the card. The card type label is either located at the beginning or the end of the card. Card type labels are at the beginning of ESI and CCRF cards and at the end of VI, MTDS, and SSF cards. Note that data sheets may contain more than one card of the same type, and that the various sheets contain differing numbers of distinct card types; the VI Sheet, for example, consists of 8 different cards numbered 1 to 8, while the MTDS contains 6 cards of only 3 distinct card types: one Card A, one Card B, and four identical cards for comments labeled C, D, E, and F.

Character. The smallest unit of data that can be entered on a data input sheet; one character fits into one column of an input card. Characters may be numeric (the Arabic numerals, the plus [+] and minus [-] signs when used to indicate the sign of a number [e.g., -2500, +3], and, in certain cases, the decimal point) or alphanumeric (everything else--alphabetic characters,

punctuation marks, etc.).

Column. The smallest element or subdivision of a card; each card consists of 80 columns. A column can be blank (assuming that inputting rules permit the omission) or can be filled in with one and only one character.

Field. A section of a data input sheet, consisting of at least one column and up to any number (in theory) of adjacent columns, a field represents a single data element (such as engine family name, transmission code, vehicle identification number, etc.). Fields are classified as numeric, in which case they can only be filled in with numeric characters, or as alphanumeric, in which case they can accommodate all standard input characters. Fields on EPA data forms are numeric unless indicated otherwise in the instructions for preparation. Note that the type of data which may be entered has been defined by EPA, and is not affected by the representation of the data. Vehicle identification number, for example, is an alphanumeric field, so that VID's which happen to be all-numeric (e.g., '1758') can be entered and will be stored and processed as alphanumerics.

Record. In general, a set of one or more consecutive fields on a related subject; each EPA input sheet, once processed, establishes one or more new records (or modifies existing records) in EPA's data base.

Key Field. A field which must be entered on a data sheet to assure successful processing. This is usually a processing code field or a field used to uniquely identify the record being established or modified.

File. A collection of records of common structure and related content; thus, all vehicle information records constitute the "Vehicle Information File.

Data Set. A complete collection of information needed to process one transaction. The input data cards for one input data sheet make up one input data set.

C. Justification of Fields

Often a data item will not completely "fill" its field; a particular vehicle identification number, for example, may be only 4 characters long, while the VID field on all EPA data sheets can accommodate up to 16 characters. When data cannot completely fill a field, use the following rule to justify data in the field: right-justify all numeric fields (i.e., situate the data item such that its final character occupies the right-most column of the field, and the left-most columns of the field are blank); left-justify all alphanumeric fields (situate the data item such that its first character occupies the left-most column of the field, and the right-most columns of the field are blank). For example, suppose that the three-character data item '123' is to be entered into a five-column field. If the field were numeric, the '123' should be entered in the last three columns; if the field were alphanumeric,

the '123' should be entered in the first three columns.

D. Coding Conventions for Data Input Forms

Keypunch operators almost inevitably make transcription errors while keypunching data from input forms to computer cards. Clear legible, unambigous printing reduces the number of data transcription errors. The following printing conventions should be observed:

number zero = 0

number one = 1

number two = 2

number five = 5

number seven = 7

letter eye = I

letter oh = O

letter ess = S

letter zee = Z

Exactly one character must be entered in each column; numeric data must be right-justified, and alphanumeric data must be left-justified. All data is numeric unless labeled "(Alpha)" in the instructions that explain how each field should be entered.

E. Levels of Precision Required for Reporting Emission Values

1. Reported Test Results

Light-duty vehicles 40 CFR 86.084-26(a)(6)(iii) for 1984
Light-duty trucks

HC, CO, NOx, Evap., Part., Idle CO.--Test results shall be reported to the number of places to the right of the decimal point indicated by expressing the applicable emission standards to three significant figures.

STANDARDS

LDV (86.082-8 (a-b) for 1984, low-altitude)
(86.082-8 (d-f) for 1984, high-altitude)

LDT (86.084-9 (a-b) for 1984, low-altitude)
(86.084-9 (d-e) for 1984, high-altitude)

	1984 Low-Altitude	1984 High-Altitude	1984 Low-Altitude	1984 High-Altitude
HC	.41 g/mile	.41 g/mile	.80 g/mile	1.0 g/mile
CO	3.4 g/mile	3.4 g/mile	10.0 g/mile	14.0 g/mile
NOx	1.0 g/mile	1.0 g/mile	2.3 g/mile	2.3 g/mile
Evap.	2.0 g/test	2.0 g/test	2.0 g/test	2.6 g/test
Partic.	.60 g/mile	N/A	.60 g/mile	N/A
Idle CO	N/A	N/A	.47 %	.51 %

STANDARDS (expressed to three significant figures)

LDV

	1984 Low-Altitude	1984 High-Altitude
HC	0.410	0.410
CO	3.40	3.40
NOx	1.00	1.00
Evap.	2.00	2.00
Partic.	.600	N/A

LDT

	1984 Low-Altitude	1984 High-Altitude
HC	.800	1.00
CO	10.0	14.0
NOx	2.30	2.30
Evap.	2.00	2.60
Partic.	.600	N/A
Idle CO	.470	.510

Examples of correctly reported test results:

	LDV Low-and High-Altitudes	LDT
HC	1.214, 0.391, 0.019	HC 1.59, 0.59, 0.09
CO	10.24, 6.37, 0.98	CO 20.2, 14.3, 9.2, 0.9
NOx	1.23, 0.23, 0.03	NOx 2.24, 0.98, 0.09
Evap.	3.64, 1.52, 0.37, 0.06	Evap. 3.64, 1.52, 0.37, 0.06
Partic.	1.312, 0.856, 0.564, 0.086	Partic. 1.312, 0.856, 0.564, 0.086
		Idle CO 1.470, 0.470, 0.014,0.001

The rules concerning the number of decimal places required for data submissions apply to data generated by durability-data, emission-data, and fuel economy data vehicles. If the number of required places changes from one year to the next as a result of change in the applicable standards, any data to be used for carryover must be recalculated and resubmitted to reflect the changed requirements of data precision.

2. Interpolated Values

HC, CO, NOx, Particulates - 4 places to the right of the decimal (minimum)	86.084-28(a)(4)(i)(B) - 1984

Examples -1.2345, 0.2345

3. Deterioration Factors

a. HC, CO, NOx, Particulates, Idle CO --rounded to 3 decimal places (use minimum of 1.000 when calculating certification level)	86.084-28(a)(4)(i)(B) - 1984

Examples -1.234, 1.009

b. Evap.--minimum of 2 decimal places (use minimum of 0.00 when calculating certification level)	86.082-28(a)(4)(i)(C) - 1984

Examples -0.68, 0.681, 2.04, 2.041

4. Certification Levels 86.082-28(a)(4)(iii) -1984

a. HC, CO, NOx, Evap., Partic, Idle C0.--2 significant figures as rounded by ASTM E 29-67 procedures.

Examples -12, 1.2, 0.12, 0.012

b. ASTM E 29-67 procedure--(l) When the figure next beyond the last place to be retained is less than 5, retain unchanged the figure in the last place retained. (2) When the figure next beyond the last place to be retained is greater than 5, increase by 1 the figure in the last place retained. (3) When the figure next beyond the last place to be retained

is 5, and there are no figures beyond this 5, or only zeros, increase by 1 the figure in the last place retained if it is odd, leave the figure unchanged if it is even. Increase by 1 the figure in the last place retained, if there are figures beyond this 5.

Examples -12.5 rounds to 12, 13.5 rounds to 14, 1.25 rounds to 1.2, 1.35 rounds to 1.4, 12.51 rounds to 13

5. Determination of range of emission results which meet 1984 LDV low-altitude standards by rounding

HC	> 0.415 fails
CO	> 3.45 fails
NOx	> 1.05 fails
Evap.	> 2.05 fails
Partic.	> .605 fails

Determination of range of emission results which meet 1984 LDV high-altitude standards by rounding

HC	> 0.415 fails
CO	> 3.45 fails
NOx	> 1.05 fails
Evap.	> 2.05 fails

Determination of range of emission results which meet 1984 LDT low-altitude standards by rounding

HC	> 0.805 fails
CO	> 10.5 fails
NOx	> 2.35 fails
Evap.	> 2.05 fails
Partic.	> 0.605 fails
Idle CO	> 0.475 fails

Determination of range of emission results which meet 1984 LDT high-altitude standards by rounding

HC	> 1.05 fails

CO	> 14.5 fails
NOx	> 2.35 fails
Evap.	> 2.65 fails
Idle CO	> 0.515 fails

F. Data Submission Procedures

1. Timing of Submissions

In general, data forms should be submitted, as soon as the data to be entered on them is available. This principle implies the following sequence of submissions:

a. Engine-System Information Sheet. An ESI Sheet should be submitted at or before the time when the durability-data vehicle representing the engine-system combination begins testing at other than zero miles. If certification of the engine family is being sought on the basis of the carryover or carry-across of durability data, the Engine-System Information Sheet should be submitted as soon as the manufacturer has determined that the data to support certification of the engine family is eligible for carryover or carry-across. (This should occur no later than the initiation of certification testing by any emission-data vehicle representing the engine family.)

b. Vehicle Information Sheet. The VI Sheet can be submitted, as soon as the corresponding test vehicle has been built, and in no case later than the vehicle's first test point which generates data that are intended for use in the certification process. Note that a test vehicle's VI Sheet cannot be processed until the ESI Sheet has been successfully processed for that vehicle's engine-system combination.

c. Manufacturer's Test Data Sheet. Emission test results entered on MTDS's should be air posted or delivered to EPA within 7 working days as required by 40 CFR 86.084-26(a)(6)(ii). An MTDS cannot be processed until the VI Sheet for that test vehicle has been successfully processed.

d. Summary Sheet Input Form. As part of the Request for Certification section of the application for certification (Application Format Section 16 or 20), the SSI should be submitted after all testing has been completed for initial certification of an engine family/evaporative-emission family combination. This must be submitted at least 30 days before a certificate of conformity is needed.

Running Change applications: If a manufacturer performs testing to support a running change, the running change application should include at least one VI Sheet (reflecting modification to an existing test vehicle or describing a new test vehicle) and all appropriate MTDS's.

Fuel Economy Data Vehicle (FEDV) packages: VI Sheets and MTDS's pertaining to an FEDV should be submitted together as part of an FEDV package. If Certification Branch personnel determine after review of an FEDV package that additional testing is required, results of such testing should be air posted or delivered within 7 working days.

2. Submission Procedures for Hard Copy Data Forms

The manufacturer may obtain blank data forms from and submit the completed forms to the manufacturer's designated certification team member. Cover letters are not necessary when forms are submitted. The team member receiving the data forms will promptly transmit them to the data processing staff, who will keypunch, verify, and process computer cards based on the forms. Copies of all output documents will be forwarded to the manufacturer to provide a record of information added to the EPA data base. Unless advised to the contrary, EPA assumes that the output document represents accurate data for an official submission.

3. Submission Procedures for Machine-Readable Media

a. Formats for Machine-Readable Input

Within EPA's computer system, all engine-system information, vehicle information, manufacturer's test data, summary sheet data, and certification change request data exist in "card image" format--that is, these data are read and processed as if they were a series or deck of standard, 80-column, computer cards. The structure of the data sheets reflects the card image format. The data form provides a virtually complete specification for the format of a punched card or line of a data file that can be prepared in lieu of a data form. The only differences between data sheet formats and the formats of machine-readable submissions concern processing codes. These are generally situated in Column 4 or 6 of the data form's first card, and the input card labels (single-digit numbers or letters), which are located in columns 1 and 2 (ESI, CCRF and Car/Truck Line Data Sheet) or Column 80 (VID Sheet, MTDS, SSI and Special DF/CSPM Identifier Sheet) of the input card. These fields are printed on the input forms and consequently need not be entered when the form is filled out by hand. These fields must be supplied, of course, when machine-readable equivalents of the forms are prepared. Precise coding instructions for processing codes and the input card labels are provided below in the field-by-field instructions for filling out each data form.

b. Punched Cards

(1) General Instructions

Punched card submissions may be transmitted to EPA by U.S. mail (or private carrier service) or hand-carried to EPA by the manufacturer's courier. The details of the submission procedure will depend upon the method of transmittal used. The following recommendations, however, apply to all card submissions:

(a) All punched cards must be standard, 80-column, 12-punch-position keypunch cards commonly referred to as "IBM cards." All cards should be "interpreted"--i.e., the data represented by the card punches should be printed across the top edge of the card.

(b) To assure that card decks remain in correct order, any submission of more than one card should be secured with rubber bands. (Paper clips or clamps crease cards and should not be used.) Furthermore, card decks larger than 150 cards should be marked, using a felt-tip pen or marker, with a diagonal line that runs from the rear left corner to the right front corner of the deck's top edge as illustrated below:

Reference file CD8302_1.PCX for graphic

(c) To identify submissions, card decks should bear a label indicating (1) manufacturer and (2) the data type (either ESI-Engine-System Information, VI-Vehicle Information, MTD-Manufacturer's Test Data, SS-Summary Sheet, or CCR Certification Change Request), and, (3) in parentheses, the project number (1005-Engine-System Information, 1000-Vehicle Information, 1202-Manufacturer's Test Data, 1245-Summary Sheets or 1216 - Certification Change Request 1263 -Car/Truck Line Information Sheets, 1020 - Special DF/CSPM Indentifier). The label for vehicle information and manufacturer's test data submissions should also include, on a separate line, a list of the vehicle identification numbers for which data are being submitted. The following would represent a satisfactory label:

GENERAL MOTORS VI (1000)
VID#: 100, 101, 102, 103

This information may be written with a felt-tip pen on the first card of the deck, or it may appear on a slip of discardable paper placed at the top of the deck. A discardable label should be no larger than a standard card to avoid hampering card deck storage.

(d) Subject to constraints imposed by other regulations or guidelines, particularly the requirement to submit test data within a specified time limit of their generation, the manufacturer may submit in a single card deck as many input data sets of a single type as desired. (For example, a single deck may contain the punched card equivalents of five Vehicle Information Data Sheets, each of which will consist of one to eight cards). Within a single pack of cards, however, different data sheets cannot be mixed; any attempts to combine, for instance, vehicle description information and test data in a single deck will result in processing failures that take considerable time to correct. Vehicle information and test data may be submitted at the same time of course, but the cards must be provided in separate and separately labeled decks.

(e) Punched cards constitute a portion of the official application for certification and, once submitted, cannot be returned.

(f) Output documents generated from the card data will be forwarded to the manufacturer by the certification team at the earliest possible opportunity. These documents will allow the manufacturer the opportunity to verify that submissions have been received and correctly processed.

(2) Punched Card Data Submitted by Manufacturer's Courier

Couriers may submit card decks directly to the I/O (Input/Output) window of MVEL, Room 306B, the location of EPA's computer operations section. Submissions should be accompanied by a copy of CSC-EPA Form #006, the "Manufacturer Job Request" (see Attachment l; copies are available at the I/O window). To prepare the Manufacturer Job Request, enter on the form the names of the manufacturer and the manufacturer's representative, circle the type(s) of data being submitted, and, if desired, enter in the form's "Comments" section the vehicle identification numbers of the vehicles providing the data being submitted. (If the identification numbers are provided on the Manufacturer Job Request Form, they need not be entered on the labels at the front of the card input decks. If the submission is so large or complex that all the identification numbers cannot be conveniently entered in the "Comments" section of a single form, two or more forms may be used.) The courier then should slip the Job Request into the I/O window's date-stamping machine, remove the bottom copy of the request to keep as a receipt of the submission, and present the card deck(s) and the top two copies of the Request Form to the Job Control Clerk. Output reports will be distributed to the courier by the responsible certification team member as soon as these documents are available.

(3) Punched Card Data Submitted by Mail

Since punched cards transmitted by mail can be damaged from creasing and moisture, special protection should be provided. At the minimum, cards for each type of data sheet should be placed in separate envelopes, which should

be labeled to indicate manufacturer and type of data enclosed. The individual deck(s) should then be enclosed in an second envelope, which should be

addressed to the attention of the appropriate certification team member. A padded mailing bag or a small corrugated paper box may substitute for the second envelope to provide additional protection.

To provide an additional safeguard against scrambled card decks, manufacturers may include a computer-generated listing of the card data reflecting the order in which the cards are to be submitted.

If the card decks and their protective envelopes are adequately labeled and directed to the appropriate certification team, cover letters of transmittal need not be included with the submissions.

c. Electronic Data Transfer Using the Michigan Terminal System

MVEL leases computer services from the Michigan Terminal System (MTS), a large time-sharing system operated by the University of Michigan. MTS has agreed to make available to the automotive industry user accounts for purposes of data entry and retrieval. A manufacturer assigned such an account number, and equipped with a suitable modem, terminal, and telephone line, should be able to "communicate" with MTS from any point in the continental United States.

Once a manufacturer has obtained an MTS account and solved the hardware-related problems of interfacing with the MTS system, the process of communicating with EPA is fairly straightforward. Typically, the manufacturer creates five input data files on the manufacturer's MTS account (one each for engine-system information, vehicle information, manufacturer's test data summary sheet data, and certification change requests). Likewise, five output files must be created where EPA processing programs can store results reports. The manufacturer must allow selected EPA production accounts to access these files. EPA must be able to read and write the input and output files. To enhance security, EPA recommends that access should only be permitted to the manufacturer's account and production EPA accounts. Whenever necessary, the manufacturer enters data to the input data files. At the end of the day EPA automatically accesses these files. If no data is discovered, nothing happens, if data is found, the data is processed, the input files are emptied and truncated by EPA, and the results reports produced by EPA processing programs are written to the end of the manufacturers' output files. (In special curcumstances, EPA will honor manufacturer's requests to process data as soon as the manufacturer transmits it.)

The advantages of this data entry approach are rapid turnaround, increased accuracy, convenience, and reduced risk of loss or damage resulting from the physical transfer of material to and from EPA. On the other hand, the cost of equipment, system establishment, system maintenance, and MTS charges may make this method impractical for smaller manufacturers with limited data entry

needs. Manufacturers are urged to contact the Leader of the Computer Support Section, Certification Policy and Support Branch, to obtain further details.

G. Responsibilities for Accuracy of Data Submissions

Just as the manufacturer has the primary responsibility for assuring that his application for certification is complete and correct, he also has responsibility for making full and accurate submissions of data. Should the manufacturer find mistakes or omissions when reviewing result reports generated from data submissions, the manufacturer should make whatever additional submissions are necessary to correct errors.

EPA assumes responsibility for finding and correcting errors that occur when data are transferred from input sheets or files to the computer. Of course, EPA retains full authority to evaluate a manufacturer's data submissions and to assure their conformity with EPA's standards. If EPA discovers shortcomings in a manufacturers' data, EPA will inform the manufacturer of the problems and explain how they can be eliminated.

This data policy in no way diminishes the importance of providing EPA with input data of the highest possible quality. A manufacturer may jeopardize the timely completion of his certification program if his data entry efforts are less than totally conscientious. Unless accelerated by electronic data transmission, the process of error correction entails a cycle of transferring correction input forms from manufacturer to certification team member to data processing function and output documents back to the certification team and then to the manufacturer. This cycle ordinarily consumes one to two business days regardless of EPA's efforts to speed this data flow. Further, industry should be aware that the data and supporting software that comprise the Light-Duty Data System are extensively interdependent; the successful processing of a Summary Sheet, for example, depend on the successful prior processing and updating of all related ESI sheets, VI Sheets, and Manufacturer Test Data Sheets. Obviously, any manufacturer eager to receive his certificates will want to avoid the delays of data correction by submitting input forms that are correct in every detail.

II. THE ENGINE-SYSTEM INFORMATION SHEET

A. Introduction

Engine-System Information Sheets (Attachment 2) are used at the beginning of

the certification year to describe the vehicles covered by the engine families which a manufacturer is tendering for certification. One Engine-System Information Sheet should be submitted to EPA for each engine-system combination within each engine family which the manufacturer is tendering for certification. The sheet contains information that provides a basis for auditing manufacturers' programs. Successful processing of an ESI sheet generates an "Input Data Update Report" (see Attachment 3 for an example). This report, which the Certification Branch will forward to the manufacturer at the earliest opportunity, should be checked to assure the accuracy of the data entered into the ESI data base.

B. Error-Checking Performed by the ESI Processing Program

The ESI processing program screens all submissions by performing the following error checks:

1. It confirms that all coded fields--Manufacturer Code, Processing Code, Exhaust Emission Related Components, Parameters Sensed, and Parameters Controlled--contain inputs defined as valid by the instructions in II.D below;

2. It confirms that the information implicit in the Engine Family field is consistent with related information in other fields (e.g., if the Engine Family name implies the presence of a three-way catalyst, then the Exhaust Emission Related Components should also indicate the presence of a three-way catalyst);

3. It confirms that numeric fields are right-justified and free of alphabetic characters. If any of these conditions are violated, the processing program will reject the submission and print an "Error Report" to identify exactly the nature of the problem. (For a sample "Error Report," see Attachment 4).

C. Four Types of ESI Sheet Submissions

1. "New" or New Entry Submission: A "new" ESI Sheet is used to enter data into the ESI system for the first time. To prepare a "new" entry:

a. Check the "NEW" box in the upper left-hand corner of the ESI Sheet and leave the Processing Code field [Card El, Col. 6] blank.

b. Fill in all fields according to the instructions provided in Section II.D below.

2. "Correction" Submissions: These should be used to correct erroneous data on a previously submitted sheet, and to update information on an engine-system that has changed in the course of the certification process. (Periodic updating of some data elements by the manufacturer (especially Sales Code) may be necessary to assure that the ESI data base remains accurate and current.) Once the ESI Sheet has been submitted, the Manufacturer Code (MFR CODE, Card E1, Cols. 3-5), Engine Family Name (ENGINE FAMILY, Card El, Cols. 7-18), and System # (SYSTEM #, Card El, Col. 23) will require special handling in order to be corrected, as these 3 fields are "key" fields. The need to correct any of these key fields should be brought to the attention of the Certification Branch. The following procedure should be followed to correct erroneous, missing, outdated, or inapplicable data inadvertently submitted in the other fields of the ESI Sheet:

a. Check the "CORRECTION" box in the upper left-hand corner of the Engine-System Information Sheet and enter "M" in the Processing Code Field Card El, Col. 6 to indicate that a correction is being submitted.

b. Fill in the key fields: The Manufacturer Code, the Engine Family Name, and the System # on Card E1 to identify the record which is to be corrected.

c. Then fill in (correctly) the columns which are to be altered. With the exception of the fields specified below, the correction process simply overlays the erroneous columns of the field being altered with new data. To blank out a column, enter an asterisk (*). If it is necessary to blank out an entire field, enter asterisks in every column of the field.

d. The following four field groups with space for several component entries should be treated as a whole for purposes of correction:

EXHAUST EMISSION RELATED COMPONENTS
MAJOR SCHEDULED MAINTENANCE MILEAGE POINTS
PARAMETERS SENSED ELECTRONICALLY
PARAMETERS CONTROLLED ELECTRONICALLY

Any new submissions for these field groups must entirely replace the previous information. Thus, if any part of these four groups need to be corrected, reenter the entire group (e.g., reenter all of the exhaust emission related components with which the vehicles in the engine family are equipped).

e. Similarly, any changes to card E4 or E5 automatically "blank out" all previously entered information on the card. Thus, reenter

information that should be preserved from previous submissions, as well as the new or altered information, when corrections are made to the information previously submitted on either card.

3. "Cancellation" Submissions: If an engine-system combination is cancelled, submit a "Cancellation" ESI Sheet:

a. Check the "CANCELLATION" box in the upper left-hand corner of the Engine-System Information Sheet and enter "C" in the Processing Code field Card El, Col. 6 to indicate a cancellation is being submitted.

b. Fill in the Manufacturer Code, Engine Family Name, and System # on Card E1 to identify the engine-system being cancelled.

An Engine-System Information "Cancellation" sheet should be submitted for each engine-system cancelled as soon as the decision to cancel is made.

4. "Reactivation" Submissions: Occassionally, a manufacturer may wish to reactivate an engine-system combination which was previously cancelled. In such a case, a "Reactivation" ESI Sheet should be submitted:

a. Check the "REACTIVATION" box in the upper left-hand corner of the ESI Sheet and enter "A" in the Processing Code Field Card El, Col. 6 to indicate a reactivation is being submitted.

b. Fill in the Manufacturer Code, Engine Family Name, and System # on card El to identify the engine-system being reactivated.

c. If there are changes to previously submitted information, these should be made on the "Reactivation" sheet following the directions found in paragraphs 2.c through 2.e above for "correction" submissions.

II.D (Follows)

COL	FIELD NAME	FIELD DESCRIPTION
** CARD E1 **		
1-2	(Card No.)	Card No. E1
3-5	MFR CODE -	3-digit numeric code for manufacturer found on the back of the Vehicle Information Data Sheet.
6	PROC CODE	Type of Engine-System Information submission (Note: Key fields for all submissions are MFR CODE, ENGINE FAMILY, and SYSTEM D) New: No information on this engine-system has been previously submitted. M Correction: Submission will correct erroneous information in an existing record. C Cancellation: Submission will cancel engine-system. A Reactivation: Submission will reactivate previously cancelled engine-system.
7-18	ENGINE FAMILY (Alpha)	The EPA standard engine family name as defined in the Appendix to Application Format for Certification of Light-Duty Motor Vehicles--1983 Model Year. For engine families with dual displacements, the engine family name entered on the Sheet should include the larger of the two displacements.
19	(Blank)	Blank
20-22	ALT DISPL (Alternate Displacement)	The smaller of the two displacements for dual displacement engine families in the same units (liters or cubic inches) as used in the engine family name. If single displacement engine family, leave blank.
23	SYSTEM #	A number identifying the engine-exhaust-system combination for which the sheet is being filled out. If only one engine-exhaust system combination in engine family, enter l.
24-43	EXHAUST EMISSION RELATED COMPONENTS	2-digit codes identifying the exhaust emission related components used in the vehicles of the engine family: 01 Combustion Chamber/Non-Conventional Valve Train 02 Engine Modification (diesel only) 05 Thermal Reactor 10 Air Pump 11 Pulsating Air System 21 Closed Loop Air Injection 31 Ported EGR 32 Backpressure EGR 33 Venturi Vacuum Amplified EGR 34 Direct Throttle Activated EGR 35 Other Activated EGR 41 Multiple Point Fuel Injection

(Pulsating Air Injection)
16 Oxidation Catalyst
17 Reduction Catalyst
18 Three-Way Catalyst
19 Closed Loop
20 Three-Way Catalyst plus Closed Loop (Oxygen Sensor and Feedback Loop)
42 Throttle Body Fuel Injection
50 Turbocharger
60 De,,nation Sensor
61 Electronic Controls -Analog
62 Electronic Controls -Digital
99 Other (List names below in Card E4)

If the code list above does not include all the exhaust emission related components actually used, enter code 99 (Other) as many times as necessary and fill in Card 84 with the name of any exhaust emission related components used but not included in the code list.

44-45 NUM. NEW COMPON. (Number of New Components) — The number of exhaust emission related components never before used on an engine family certified by the manufacturer.

46-52 PROJECTED SALES - 49-STATES — The total projected sales in the 49 states (excluding California) for the engine-exhaust-system (enter at the manufacturer's option). (Note that the total 49-state sales should be the same for each prime and associated backup engine family.)

53-58 PROJECTED SALES - — The total projected sales in California for the engine-exhaust-system (enter at the manufacturer's option). (Note that the total California sales should be the same for each prime and associated backup engine family.)

59 CO/CA CODE (Carryover/ Carry-across Code) — Code indicating if manufacturer intends to carry over/carry across data to support certification of the engine family represented by engine-exhaust-system combination)
1 Carryover of data will be requested
2 Carry-across of data will be requested

COL FIELD NAME — FIELD DESCRIPTION

60-79 MAJOR SCHEDULED MAINT MILEAGE POINTS — The mileage points (from lowest to highest) at which major engine tuneups are scheduled to take place.

80 SALES CODE — Code indicating the intended sales location of the engine-exhaust-system combination:

F Only in the 49 states other than California
C Only in California
B Both California and the other 49-states (or if manufacturer cannot confidently break down projected sales into 49-state and California sales)

** CARD E2 **

1-2 (Card No.) — Card No. E2

3-8 PROJECTED JOB ONE — Projected date in MM/DD/YY form that production of vehicles from the engine family is scheduled to begin.

9-80 PARAMETERS SENSED ELECTRONICALLY — 2-Digit codes identifying all the parameters sensed to provide input to electronic controls in the engine-exhaust-system combination:

01 Coolant Temperature
02 Oil Temperature
03 Engine Radiant Temperature
04 Choke Housing Temperature
05 Exhaust Manifold Temperature
06 Catalyst Temperature
07 Passenger Compartment Temperature
08 Ambient Temperature
09 Canister Inlet Temperature
15 Oil Pressure
16 Exhaust Backpressure
17 Atmospheric Pressure
18 Air Pump Pressure
19 Fuel Tank Pressure
21 Spark Timing
23 Deep Throttle or Wide-Open Throttle
25 Idle RPM
26 Vehicle Speed
27 Engine RPM for Distributor RPM, Cam RPM, etc.)
45 Operating Condition of Accessories (e.g., Air-Conditioning on or off)
50 Time (e.g., Time Since Start)
51 Time in Mode
55 02 Content of Exhaust
56 Wastegate Flow of Turbocharger
60 Air Injection into Fuel System/Induction System
61 Air Flow through Fuel System
62 EGR Valve Pintle Position
63 EGR Flow
64 Crankcase Blow-by Flow
65 Duration and/or Amount of Fuel Injection
66 Air Injection Dump Valve Position
67 Air Injection Rate of Flow
68 Temperature of Air Taken in Via Fuel System

28 Change in Engine RPM (Surge Detector)	69 Air/Fuel Ratio
35 Manifold Vacuum/Pressure	71 Rate of Vapor Transmission
36 Change in Vacuum	72 Evaporative Storage Device Purge Rate
37 Venturi Vacuum	73 Combustion Knock
41 Throttle Position	74 Crankshaft Position Sensor
42 Transmission Gear Position	75 Inlet or Exhaust Valve Deactivation
43 Lock-up Mode	99 Other (list below in Card E5)
44 Valve Train Action/Event	

If the code list above does not include all the parameters actually sensed, enter code 99 (Other) as many times as necessary and fill in Card E5 with the names of any parameters sensed but not included in the code list.

COL	FIELD NAME	FIELD DESCRIPTION
** CARD E3 **		
1-2	(Card No)	Card No. E3
3-8	(Blank)	Blank
9-80	PARAMETERS CONTROLLED ELECTRONICALLY	2-digit codes identifying all the parameters controlled electronically in the engine-exhaust-system combination. (Use same code list as for Parameters Sensed Electronically). If the code list does not include all the parameters actually controlled electronically, enter code 99 (Other) as many times as necessary and fill in Card E5 with the names of any parameters controlled electronically but not on the code list.
** CARD E4 **		
1-2	(Card No.)	Card No. E4
3-80	OTHER EXHAUST EMISSION RELATED COMPONENTS (Alpha)	Names of all exhaust emission related components used on the engine-exhaust-system combination but not on the standard code list. Use additional Card E4's if necessary.
** CARD E5 **		
1-2	(Card No.)	Card No. E5
3-80	OTHER PARAMETERS SENSED OR CONTROLLED ELECTRONICALLY (Alpha)	Names of all parameters sensed or controlled electronically on the engine-exhaust-system combination but which are not on the standard code list. Use additional Card E5's if necessary.
** CARD E6 **		
3-80	EPA USE ONLY (Alpha)	EPA use only.

III. THE VEHICLE INFORMATION DATA SHEET

A. Introduction

The VI Sheet (VI Sheet: Attachment 5) is EPA's mechanism for entering (partial) descriptions of certification and fuel economy test vehicles into EPA's computer system. Processing data contained on a VI Sheet (1) establishes or modifies a vehicle record in the EPA Vehicle Information File (that portion of the Light-Duty Vehicle Data Base which stores test vehicle descriptions) and (2) generates a "Vehicle Specification Report" (Attachment 6), a hard-copy, reformatted summary of the newly input data.

The following instructions explain (1) the concepts of the "vehicle version" and the related distinction between "active year" and "model yearn; (2) the four types of VI Sheet submissions and the various functions and inputting rules associated with each submission type; (3) the "star-check" error checking routine performed during computer processing of every VI sheet; (4) the meaning and input rules of each data field on the VI Sheet; and (5) the "Vehicles in Data Base" report and its role in VI Sheet preparation.

B. The Concept of Vehicle Version, Active Year, and Model Year

As a consequence of provisions of the certification and fuel economy protocols, a single test vehicle may be described by more than one record in the Vehicle Information File. The practice of reconfiguring emission-data vehicles, for example, often results in a vehicle tested for original certification being recalibrated and then retested to generate fuel economy data or to support an application for a running change. Since the reconfiguration is, in every physical respect but calibration, identical to the original vehicle, both original vehicle and reconfiguration should logically share the same vehicle identification number. On the other hand, since vehicle and reconfiguration are distinct both in calibration and certification function, and must be associated with different test results, they must be clearly distinguished within the Light-Duty Motor Vehicle Data Base. Carryover of test data presents a somewhat similar problem. For example, if a durability-data vehicle has generated deterioration factors in 1983 which will be applied to certification for 1984, the VI record describing that vehicle may well need to change (1983 engine family names will differ from 1984 names), even though the physical vehicle and the test data generated have not changed at all.

EPA's method for distinguishing between such similar but distinct VI records is to label all records that share the same VID with distinct "vehicle version numbers" that run sequentially from 00 to 98; each record is known as a "version" or "vehicle version" of the original test vehicle. A new and distinct version must be created whenever:

1. A test vehicle (either a durability-or an emission-data vehicle) and its data must be carried over from one year to the next;

2. An emission-data or fuel economy data vehicle, which has already generated test data supporting a certification or fuel economy function (original certification, for example), is physically modified or reconfigured prior to testing to support an additional certification or fuel economy function;

3. An emission-data or fuel economy data vehicle, which has already generated data supporting a certification or fuel economy function, will undergo further testing under different testing or operating conditions (e.g., different equivalent test weight, dyno horsepower, or overdrive usage) to support an additional certification or fuel economy function.

In other words, new versions are required whenever the physical specifications or the testing conditions pertinent to a test vehicle are modified sufficiently such that no existing vehicle version in the data base describes this new combination of physical specifications and testing conditions with complete accuracy.

The "model year" and "active year" fields are used to indicate the currency of the data associated with each test vehicle. In the context of vehicle information processing, model year refers to the year for which data from a test vehicle was first used to support certification or fuel economy calculations (usually the year the test vehicle was built). Since model year corresponds to an action that can occur only once--there can be only one first submission of data--model year is vehicle specific and cannot be changed; thus a durability-data vehicle whose data were first tendered for 1981 certification will always have a model year of 1981, regardless of the number of times the vehicle's data is subsequently submitted for carryover. On the other hand, active year is version specific. Active year identifies the year supported by the certification or fuel economy results associated with test vehicle version. For 1981, the active year of a newly-built durability-data vehicle would be the same as its model year, 1981 (version number would be 00); if the vehicle was carried over to 1982, and version number 01 was consequently created, the active year of version 01 would be 1982 while the model year would remain 1981.

The procedures for creating new VI versions are spelled out in the following section for the four types of VI submissions. Examples of changing test vehicle's version numbers and active year designations are provided at the end of that section.

C. Data Entry Procedures for the Four Types of VI Sheet Submissions

1. "New" or New Entry Submission

a. Functions and Occasions for Use

New VI Sheets are used to describe design specifications, primarily related to emissions testing, of a certification or fuel economy vehicle that is being entered into the Vehicle Information File for the first time. (New VI entries for most certification emission-data and fuel economy data vehicles will describe specifications of newly-built vehicles. A stabilized development vehicle, tested for the first time to generate certification or fuel economy data, also needs a "new" entry, even though the actual vehicle is not new. A new drive train and emission control system combination, even if mounted in a

previously tested chassis and body shell, constitute a "new" vehicle and would require a "new" VI entry with a new VID.) A "new" VI Sheet should be prepared for inclusion in the Vehicle Book (MY84 Application Format Section 12 or 20) or in the Fuel Economy Data Vehicle Package prior to the start of mileage accumulation of the test vehicle. For Model Year 1984, "new" VI Sheets for certification vehicles can be submitted to EPA as soon as the test vehicle is built, if possible, and in no case later than the first test point that generates data that are intended for use in the certification process.

Processing a "new" VI Sheet generates a record in the Vehicle Information File which duplicates, in an altered format, the data entered on the input sheet. This record will be labeled with version number 00 and will "establish" the new VID in the data base.

b. Rules for Filling Out "New" VI Entries

1) Check the "New" box in the upper left-hand corner of the Vehicle Information Sheet. If the submission is in machine-readable form, make sure that the Processing Code field (Card 1, Col. 4) is blank.

2) Enter all fields as explained in Section II.E below. Evaporative Emission Family (Card 4, Cols. 27-40), Evaporative Emission Code (Card 4, Cols, 41-48), and Evaporative Emission Control System (Card 3, Cols. 33-34) should be omitted if the vehicle described is diesel-powered. Engine Code (Card 3, Cols. 66-79) and Evaporative Emission Code (Card 4, Cols. 41-48) may be omitted, if necessary, for durability-data vehicles.

3) Leave VI Version (Card 1, Cols. 21-22) blank; the correct version number (00) will be assigned by EPA's computer.

4) Do not enter Active Year (Card 2, Cols. 72-73); this field will be set equal to Model Year (Card 1, Cols. 56-57) by the processing computer program.

2. "Correction" Submission

a. Functions and Occasions for Use

The "Correction" VI Sheet is used to correct erroneous data, eliminate superfluous data, or add inadvertently omitted data for a particular vehicle version and does not create a new version; rather, the processing of the "correction" VI Sheet simply overlays the erroneous fields of the record being altered with new data. Correction entries should be prepared whenever erroneous, missing, or inapplicable data are discovered in any record of the Vehicle Information File. (Correction of an error identified by the VI preprocessor, discussed in Section II.D below, does not require a correction submission, since the preprocessor has not allowed the erroneous submission to be written to the VI file. In this case, the correction procedure is the simple resubmission of the original [corrected] input form.)

b. Rules for Filling Out "Correcton" Entries

1) Check the "Correction" box in the upper left-hand corner of the Vehicle Information Data Sheet. If the submission is in machine-readable form, enter "M" in the Processing Code field (Card 1, Col. 4).

2) To identify the record which is to be corrected, enter Manufacturer Code (Card 1, Cols. 1-3), Vehicle ID (Card 1, Cols. 5-20), and the specific VI Version (Card 1, Cols. 21-22). If more than one VI Version is to be corrected, a separate VI Data Sheet must be submitted for each correction.

3) To correct the record, simply fill in (correctly) all columns that need to be altered. If a column needs to be blanked out, enter an asterisk (*) in that column. If it is necessary to blank out a field, enter asterisks (*) in every column of the field.

Since EPA's software makes corrections on a column-by-column basis, it is possible to correct one or two characters without changing an entire field. To correct Transmission Code (Card 4, Cols. 22-26) from 'ABCDE' to 'ABF', for example, enter 'F**' in Cols. 24-26 or 'ABF**' in Cols. 22-26. To enter 'ABF' in Cols. 22-24 without inserting asterisks in Cols. 27-28 would produce a record reading 'ABFDE'.

4) A few fields cannot be corrected by submitting and processing a "correction" VI Sheet. Model Year (Card 1, Cols. 56-57) and Active Year (Card 2, Cols. 72-73) may never be modified using this method; Equivalent Test Weight (Card 1, Cols. 70-74) and Actual Dynamometer Horse-power (Card 1, Cols. 77-79) may not be modified after tests have been run against the (erroneous) specifications. Special care should be taken, obviously, to assure that these fields are filled out properly the first time they are submitted. If input errors for these fields occur, consult with the designated certification team member, who will initiate special action with

CD's data-processing personnel to correct the problem.

5) If the Emission Control System field (Card 3, Cols. 23-32) needs correction, re-enter the entire field (i.e., re-enter every emission control system with which the vehicle is equipped). Delete unwanted systems with asterisks.

6) Any change to the Comments section (Cards 6, 7, 8) automatically "blanks out" all these cards before new comments are entered into the VI File. Thus, it is necessary to re-enter all comments that should be preserved from the version on which the change is based, as well as to enter the altered comments for the first time.

3. "Change" Submission

a. Functions and Occasions for Use

The "Change" VI Sheet is used to describe modifications of either components, test conditions, or test procedures relevant to an existing emission-data or fuel economy data vehicle configuration (and, self-evidently, to an existing vehicle version in the Vehicle Information File.) The processing program makes a copy of the record on which the modification to be based, alters this copy to reflect the changed specifications, labels it with the smallest version number as yet unassigned, and then stores it in the Vehicle Information File. Hence the processing of a "Change" submission creates a new version that reflects the new specification(s).

Change VI Sheets should be submitted:

1) To describe a certification emission-data vehicle or fuel economy data vehicle that is being physically modified and retested, or retested under different testing conditions, to serve as a (different) fuel economy data vehicle;

2) To describe a certification emission-data or fuel economy data vehicle that is being physically modified and retested, or retested under different testing conditions, to support a running change application;

3) To describe the "fix" recalibration on a certification emission-data vehicle which, when previously tested in a different calibration, failed emission testing.

Note that no change entries are permissible for durability-data vehicles.

b. Rules for Filling out "Change" Submissions

1) Check the "Change" box in the upper left-hand corner of the VI Sheet. If this submission is in machine-readable form, enter "R" in the Processing Code field (Card 1, Col. 4).

2) To identify the record that should be changed, enter Manufacturer Code (Card 1, Cols. 1-3), Vehicle ID (Card 1, Cols. 5-20), and the VI Version on which the carryover is to be based (Card 1, Cols. 21-22). EPA's processing program will assign the appropriate new version number. (This inputting rule necessitates that manufacturers who submit "Change" VI Sheets need to know the version numbers of their vehicles already present in the Vehicle Information File. This information is available in EPA's "Vehicles in Data Base" report, which is explained in section II.F below.)

3) Fill in only those fields that are to be changed.

4) Model Year (Card 1, Cols. 56-57) and Active Year (Card 2, Cols. 72-73) cannot be altered by means of a "Change" submission.

5) If it is necessary to blank out a field, enter asterisks (*) in every column of the field.

6) If the Emission Control System field (Card 3, Cols. 23-32) must be changed, re-enter the entire field (i.e., re-enter every control system with which the vehicle is equipped). Delete unwanted systems with asterisks.

7) Any change to the Comments section (Cards 6, 7, 8) automatically "blanks out" all three cards before the new comments are entered into the VI File. Thus, it is necessary to re-enter all comments that should be preserved from the version on which the change is based, as well as to enter the altered comments for the first time.

4. "Carryover" Submissions

a. Functions and Occasions for Use

A "carryover" submission is used to generate a new vehicle version so that test data generated by a vehicle version during a previous Active Year can be related to a VI record with the current Active Year and so used again to support certification. Carryover submissions should be prepared as soon as it is determined that carryover of data is permissible in accordance with 40 CFR 86.081-24(f) and Advisory Circular No. 17F.
Processing of "carryover" submissions closely resembles the processing of "change" submissions. The computer makes a copy of the record on which the carryover is to be based, alters this copy to reflect any modified specifications, labels the new record with the smallest version number as yet unassigned, and then stores the record in the Vehicle Information File. Note

again that "carryover" processing generates a new vehicle version.

b. Rules for Filling Out "Carryover" Submissions

1) Check the "Carryover" box in the upper left-hand corner of the VI Sheet. If this submission is in machine-readable form, enter "C" in the Processing Code field (Card 1, Col. 4).

2) To identify the data that should be carried over, enter Manufacturer Code (Card 1, Cols. 1-3), Vehicle ID (Card 1, Cols. 4-20), and the VI Version on which the carryover is to be based (Card 1, Cols. 21-22). EPA's processing program will assign the appropriate new version number. (This input rule makes it necessary for manufacturers submitting carryover VI Sheets to know the version numbers of their vehicles already present in the Vehicle Information File. This information is available in EPA's "Vehicles in Data Base" report, which is explained in section II.F below.)

3) Enter the new Active Year (Card 2, Cols. 72-73). If appropriate, enter any of the following fields whose content has changed from one Active Year to the next:

Represented Car Line Code (Card 1, Cols. 29-33)
Model Code (Card 1, Col. 54)
Engine Family (Card 3, Cols. 46-61)
Sales Class (Card 3, Cols. 62-63)
Engine Code (Card 3, Cols. 66-79)
Evaporative Emission Family (Card 4, Cols. 27-40)
Evaporative Emission Code (Card 4, Cols. 41-48)

Do not modify fields which describe physical parameters (e.g., Axle Ratio, N/V Ratio, Actual Dyno Horsepower, etc.); all physical specifications should be the same as the original test vehicle specifications that produced the carryover data.

4) Once a version is carried over, the same version may not be carried over a second time. Either the newly carried over version or a subsequent version must be carried over to subsequent years.

5) If it is necessary to blank out a field, enter asterisks (*) in every column of the field.

6) Any change to the Comments section (Cards, 6, 7, 8) automatically "blanks out" all three cards before new comments are recorded in the VI File. Thus, it is necessary to re-enter all comments that should be preserved from the version on which the change is based, as well as to enter the altered comments for the first time.

5. Examples of the Types of VI Submissions

a. Situation 1: A durability-data vehicle first provides deterioration factor data to support Model Year 1980 certification. These data are subsequently carried over to the 1981 and 1984 Model Years. Appropriate VI Submissions: A "new" VI Sheet is required for the original submission (Version 00); the associated VI record will have Model Year and Active Year of 1980. A "carryover" submission should be used to create version 01, with Model Year 1980 and Active Year 1981. A second "carryover" submission will produce Version 02, with Model Year again of 1980 but Active Year of 1984.

b. Situation 2: An emission-data vehicle (Vehicle Type 01, Cert Emission-Data) is built and tested for 1982 Model Year certification. After issuance of the certificate, the manufacturer decides to reconfigure the vehicle and perform back-to-back tests to support an application for a running change (Running Change 1). (The "baseline" configuration for Running Change 1 is the original emission-data vehicle). The manufacturer then decides to modify the test vehicle further, and to generate back-to-back data to support Running Change 2. In this instance both before and after tests are conducted on configuration not previously tested (i.e., the "before" or baseline configuration for Running Change 2 is covered by the original certificate of conformity, but this baseline configuration does not exist in EPA's data base and has not been tested in support of certification or fuel economy functions). EPA accepts these additional data and approves Running Change 2, but implementation of Change 2 sufficiently alters the affected base level's sales mix that fuel economy regulations require additional test data representing yet another configuration. The vehicle is reconfigured and retested to meet the fuel economy requirement.

Appropriate VI Submissions: The original vehicle necessitates submission of a "new" VI Sheet, creating a record with Version 00, Model Year 1984, and Active Year 1984. A "change" submission is needed for Running Change 1. (The "before" city and highway tests for Change 1 should be associated with the original certification configuration (Version 00), while the "after" tests should be linked with the product of the first "change" submission, Version 01.) Two more "change" submissions are needed to account for Running Change 2: Version 02 will describe the "baseline" condition and be associated with the "before" tests, while Version 03 will describe the "after" condition and be associated with Change 2's "after" tests. One last "change" submission will be required to cover the last reconfiguration performed to comply with Fuel Economy Requirements: this submission will produce Version 04, with Vehicle Type 03 (Fuel Economy Data Vehicle), Active and Model Years of 1984, and an indication of the physical change to the vehicle or of testing condition which provided the basis for reconfiguration.

c. Situation 3: An emission-data vehicle is built and tested for 1983 Model Year certification. Some time after the issuance of the certificate, the vehicle is given additional testing, without changing test conditions, under authority of 40 CFR 600.007 and 600.008.

Appropriate VI Submissions: A "new" VI Sheet will cover the original submission; the record in the VI File should have Version 00 and both Model Year and Active Year of 1984. No other VI submission is required. Since the retests were authorized by fuel economy regulations, the Test Type on any pertinent Manufacturer's Test Data Sheets (Card 1, Cols. 27-78) should be coded '31' (fuel economy) rather than '01' (Certification emission-data).

d. Situation 4: An emission-data vehicle is built for 1983 Model Year certification and, when confirmatory tested at EPA, fails the HC standard. The manufacturer recalibrates the vehicle and it subsequently passes all emissions testing.

Appropriate VI Submissions: A "new" VI Sheet will cover the original emission-data vehicle; this submission will be Version 00 and will have Active Year and Model Year of 1982. A "change" submission, creating Version 01 with Active Year and Model Year of 1983, must be entered to account for the new calibration.

e. Situation 5: An emission-data vehicle is built and tested for 1983 Model Year certification and the vehicle is tested again for the new Model Year 1984 and the 1983 Model Year test data is not to be carried over.

Appropriate VI Submissions: A "Change" VI Sheet for the 1983 model year will create a new version which would be carried over to the 1984 model year. The "change" submission for the 1983 model year breaks the tracking chain for identifying carried over data.

D. Error-Checking Performed During Vehicle Information Processing

To preserve the quality of data being entered into the Vehicle Information File, EPA's computer system subjects all VI Sheets to a two-part screening process. First, all VI Sheets are run through a "preprocessor," which makes sure that all key fields on the input sheets have been entered, and that no alphabetic characters have been entered into numeric fields. If the pre-processor detects such a mistake, the new submission will not be processed further, and an error report identifying the precise input error(s) will be generated and returned to the manufacturer. The data entry errors which cause the preprocessor to reject an input are identified in the field-by-field data entry instructions in Section II.E below. An example input data report is shown in Attachment 7.

If the preprocessor finds no error, the VI data is "sent on" to the main program for final processing and, under most circumstances, updating of the VI file. This main processing program incorporates additional data-screening features known collectively as the "Star-Check" error-checking routine. The "Star-Check" program distinguishes between three kinds of data entry errors.

A "three-star" error is sufficiently critical to abort processing immediately; no additions or changes will be made to the Vehicle Information File, and the only output will be a short explanatory error message. (A listing of all such error messages with explanations of their meanings is supplied by Attachment 8). "Two-star" and "one-star" errors do not terminate processing, and the master program will still enter the data containing errors into the VI File and generate a Vehicle Specification Report, but two-star and one-star errors will prohibit the assignment of EPA test numbers to any test involving this vehicle version. Test processing cannot be completed, therefore, until all star-check errors have been eliminated from the pertinent VI records.

Commission of any one-or two-star data entry errors is clearly indicated on the Vehicle Specification Report: a heading at the top of the report indicates the number of one-and two-star errors the vehicle information record contains each erroneously entered data field (together with the invalid datum as entered) is flagged on the report by a string of dollar signs ($$$$$$$$$$) and an error reporting page attached to the main report lists all invalid data fields and suggests the possible sources of error.

E. Field-by-Field Instructions

CARD 1

Column Number	Field Title	Instructions
1 -3	MFR CODE (Manufacturer Code)	Enter the appropriate three-digit manufacturer code listed on the back of the VI Data Sheet Erroneous entries of this data item cannot be corrected by submitting a "Correction" VI Sheet: special time consuming intervention by EPA's computer staff is necessary. Special effort should be made, therefore, to assure that the Manufacturer Code is submitted correctly. If this item is blank or contains a code not officially approved by EPA, the VI preprocessor will reject the submission.

4	[Processing Code]	Leave blank if this vehicle information is being submitted on a hard-copy input sheet. (The content of this field is supplied by checking the appropriate portion of the "NEW CORRECTION CHANGE _ CARRYOVER ____" line in the upper left-hand corner of the VI Sheet.) If this information is being submitted in computer-readable form, a processing code must be supplied in this column, even though this field is blackened out on the hard-copy input form. The codes are as follows: Blank (no entry) -New VI submission M -Correction submission R -Change submission C -Carryover submission If one of these codes is not entered, the VI preprocessor will reject the submission.

Column Number	Field Title	Instructions
5 -20	VEHICLE ID (Alpha)	Enter the exact vehicle identification number. (All future references to this vehicle must exactly cite the vehicle identification number entered here. This field cannot be corrected by submitting a "Correction" VI Sheet; special, time-consuming EPA intervention by EPA's computer staff is required for correction. Special effort should be made to assure that the Vehicle ID is entered correctly.) If this field is left blank, the VI preprocessor will reject the submission.
21 -22	VI VERSION	A full explanation of this field is contained in Section II.B above. In summary, (1) if this VI entry is a "new" submission, leave the field blank, and the processing program will automatically assign the Version Number 00; (2) if this VI entry is either a "correction," "change," or "carryover" submission, enter the version number on which the correc-tion, change, or carryover is to be based.

		(Processing of a correction will not cause any change of version number; processing of a change or carryover will automatically assign the smallest as-yet-unassigned number between 1 and 98 as the new version number for the modified or carried over vehicle.) Manufacturers are responsible, with the aid of EPA's Vehicles in Data Base Report, for keeping track of current version numbers for their test vehicles. If this item is non-blank for a new submission, or blank for a correction, change, or carryover submission, the VI preprocessor will reject the submission. Use of an "illegal" version number--for example, 04 if the only versions in the data base are 00 and 01--produces a *** error.
23 -28		Leave blank.
29 -33	REPRESENTED CAR LINE CODE	Enter the 5 digit code assigned by the Certification Branch to specify the car line that this vehicle represents. Note that Represented Car Line may change from one vehicle version to another. If an emission-data vehicle is to be carried over from one model year to the next, and during

Column Number	Field Title	Instructions
		the second model year will represent a new car line, then the carryover submission needed should contain the new represented car line code. Represented car line codes greater than 50000 are trucks; codes less than 50000 are vehicles. An invalid car line code--a value not present in EPA's offcial car line file causes a * error.
34 -53	ACTUAL VEHICLE MODEL (Alpha)	Enter the model name of the actual test vehicle. Since this item is not a design specification, but a speci-

		fication pertaining to the physical vehicle built for testing, the Actual Vehicle Model should not change throughout the vehicle's history. Failure to supply or to left-justify this field causes a * error.
54	MODEL CDE (Model Code)	Enter the code that most accurately describes the vehicle or truck the test vehicle represents: 1 Sedan 2 Truck 3 Van 4 Station Wagon For purposes of this field, any light-duty vehicle that is not a station wagon is considered a sedan. Failure to enter one of these codes causes a ** error.
55	DRIVE CDE (Drive Code)	Enter the drive code that most accurately describes the test vehicle: 1 Rear Drive, Left-hand Steering 2 Rear Drive, Right-hand Steering 3 Front Drive, Left-hand Steering 4 Front Drive, Right-hand Steering 5 4-Wheel Drive, Left-hand Steering 6 4-Wheel Drive, Right-hand Steering Drive Code describes the actual test vehicle and is not a design specification. Failure to enter a numeric value between 1 and 6 will generate a * error.

Column Number	Field Title	Instructions
56 -57	MODEL YEAR	For "new" VI submissions, enter the model year for which test data generated by the vehicle will first be used to support certification--usually the year the test vehicle is built. Since Model Year refers to the unique first submission of data, this data item cannot change from one certification year (or vehicle version) to the next. For this reason this field must

		be left blank for "change", "carryover", and "correction" submissions (the processing program will transfer original values of model year to new records whenever a new VI record is written to the data base). If this field is left blank on a "new" submission, or is not blank on a "change", "correction", or "carryover" submission, the VI preprocessor will reject the submission. For further explanation, see Section II.B above. An illegal model will generate a ** error.
58 -59	SOURCE CODE	All manufacturers' test vehicles should be coded 01. An illegal or missing source code will generate a * error.
60 -61	VEHICLE TYPE	Enter the code which indicates the certification function this vehicle will perform: 01 -Cert Emission-Data Vehicle 02 -Cert Durability-Data Vehicle 03 -Cert Fuel Economy Data Vehicle Certification running change vehicles should be coded 01 or 03; supplementary fuel economy data vehicles supporting running changes applications (needed for testing additional configurations within a significant base level) should be coded 03. Vehicle Type can and should change to reflect differing versions of a given vehicle; for example, an emission-data vehicle built for original certification of Version 00, Vehicle Type 01 would, if reconfigured with a different axle ratio

Column Number	Field Title	Instructions
.		
		into a fuel economy data vehicle, become Version 01 with Vehicle Type 03. Failure to enter one of the five codes listed above will generate a ** error. If this field is left blank on a "new" submission, the VI

		preprocessor will reject the submission. For further explanation, see Section II.B above.
62 -64		Leave blank.
65 -69	CURB WEIGHT	Enter the design vehicle curb weight, as defined by 40 CFR 86.077-2, measured in pounds. Omission of this field or entry of a value less than 1000 or greater than 10000 will generate a ** error.
70 -74	EQUIV TEST WEIGHT (Equivalent Test Weight)	Enter the equivalent test weight (in pounds) at which this vehicle version will be tested. (See the table of equivalent test weights published in 40 CFR 86.129-80.) Failure to enter one of the values given in this table causes a ** error.
75	UNITS (Alpha) (Units for Curb Weight and Inertia Setting)	Enter "P" for pounds. Failure to do so will generate a ** error.
76	O/D CODE (Overdrive Code)	Enter the appropriate transmission overdrive code: 1 -No gear ratio 2 -Top gear ratio 3 -Electrically operated overdrive Failure to enter one of the three codes will produce a * error.
77 -79	ACTUAL DYNO HP	Enter the dynamometer horsepower (dynamometer power absorber setting) to be used when testing this vehicle version. Omission of this item, or entry of a value less than 3.0 or greater than 30.0, will generate a ** error.
80	[Card Number]	Leave blank if these data are submitted on a hard-copy VI Sheet. Enter "1" if these data are submitted in machine-readable form.

Column

Number	Field Title	Instructions
		CARD 2
1 -5	DISPL (Displacement)	Enter the nominal engine displacement in units specified in Column 16 of Card 2. A discrepancy between this field and the information in the corresponding ESI record will cause a *** error. Omission of this field, cubic inch displacements smaller than 40 or greater than 500, or cubic centimeter displacements smaller than 655.5 or greater than 8193.5 will cause a * error.
6 -10	BORE	Enter the nominal cylinder bore in units specified in Column 16. Omission of this field, inch measurements smaller than 2.00 or greater than 4.50, or millimeter measurements smaller than 50.8 or greater than 114.3 will cause a * error. If Engine Configuration (Card 2, Cols. 22-23) is coded 04 (Rotary), leave blank or a * error will result.
11 -15	STROKE	Enter the nominal stroke in units specified in Column 16. Omission of this field, inch measurements smaller than 2.00 or greater than 4.50, or millimeter measurements smaller than 50.8 or greater than 114.3 will cause a * error. If Engine Configuration (Card 2, Cols. 22-23) is coded 04 (Rotary), leave blank or a * error will result.
16	UNITS (Alpha) (Units for Displacement, Bore and Stroke)	Enter the units for engine displacement, bore and stroke as listed below: E -English: Cubic inches or inches M -Metric: Cubic centimeters or millimeters Failure to enter one of these two codes will produce a * error.
17 -19	RATED HP (Rated Horsepower)	Enter the rated horsepower of the engine. (For manual transmission durability-data vehicles which are shifted at special speeds, enter in the "Vehicle Specs. Comments" cards (Cards 6, 7, and 8), the engine speed in RPM at which rated horsepower is obtained.) Omission of this field, or entry of a value less than 25.0 or greater than 350.0, will produce a * error.

Column Number	Field Title	Instructions
20 -21	ENG. TYPE (Engine Type)	Enter one of the engine type codes listed below: 01 Otto Spark 02 Stratified Charge 03 Diesel Failure to enter one of these three codes will generate a ** error.
22 -23	ENG CONF (Engine Config-uration)	Enter the appropriate engine configuration code listed below: 01 In-line 02 V-block 03 Opposed 04 Rotary 05 One Shaft 06 Two Shaft 07 Battery 99 Other Failure to enter one of the above codes will generate a * error.
24 -25	NO CYL (Number of Cylinders)	Enter the number of cylinders. If Engine Configuration is coded '04' (Rotary), enter the number of rotors. Omission of this field or entry of a number smaller than 2 or greater than 12 will cause a * error.
26 -27	NO CARB (Number of Carburetors)	Enter the number of carburetors. Leave blank if fuel injection is used. If carburetion is used, an entry smaller than 1 or greater than 6 will cause a * error.
28 -29	TOTAL NO BARRELS	Enter the total number of carburetor barrels. Leave blank if fuel injection is used. If carburetion is used, an entry less than 1, less than the number of carburetors, or greater than 12 will cause a * error.

30 -39	FUEL SYST MFR/MODEL (Fuel System) (Alpha)	Enter the fuel system manufacturer (e.g., 'Holley', 'Rochester', 'Mikuni') or model type.

Column Number	Field Title	Instructions
40	FI (Fuel Injection) (Alpha)	Enter 'Y' (yes) if fuel injection is used. otherwise enter 'N' (no). Failure to enter one of these codes will cause a * error. A discrepancy between this field and the corresponding record in the ESI file will cause a warning.
41	TURBO. (Turbo-charger) (Alpha)	Enter 'Y' (yes) if the vehicle's engine is equipped with a turbocharger. Enter 'N' (no) otherwise. Failure to enter one of these codes will cause a * error. A discrepancy between this field and the corresponding record in the ESI file will cause a *** error.
42 -44	COMP RATIO (Compression Ratio)	Enter the nominal engine compression ratio. Omission of this item, or entry of a value less than than 6.0 or greater than 25.0, will cause a * error.
45 -46	IGN. TIM. #l (Ignition Timing #l)	Enter the basic engine timing in degrees provided in the tune-up specifications. Omission of this item or an incorrect value will cause a ** error.
47	A or B (Alpha) (After or Before)	Enter 'A' for after or 'B' for before top dead center for timing #1. Leave blank if Ignition Timing #1 is equal to 0. If Ignition Timing #1 is greater than 0, failure to enter 'A' or 'B' will cause a ** error.
48 -49	IGN. TIM. #2 (Ignition Timing #2)	Enter the ignition timing in degrees if an additional timing is set. Otherwise leave blank.
50	A or B (Alpha) (After or Before)	Enter 'A' for after or 'B' for before top dead center for timing #2. Leave blank if Ignition Timing #2 is blank or equal to 0. Failure to enter A' or B' if Ignition

		Timing #2 is greater than 0 will cause a ** error.
51 -54	TIMING RPM	Enter the engine RPM (revolutions per minute) used for setting ignition timing. If Ignition Timing #1 is greater than 0, then entry of a value less than 200 or greater than 3200 will produce a ** error.

Column Number	Field Title	Instructions
		If Timing RPM cannot be indicated by a single number, leave the field blank and indicate the correct specification in the Comments field (e.g., 'TIMING RPM = IDLE RPM', 'TIMING RPM 600', etc.). In this case the processing program will indicate with an asterisk on the output report that the correct specification should be found in the Comments field.
55 -57	IDLE -%CO LEFT	Enter the percent CO for the left side of the exhaust system as provided in the tune-up specifications, if any. Do not enter if % CO Combined (Card 2, Cols. 61-63) will be entered.
58 -60	IDLE -%CO RIGHT	Enter the percent CO for the right side of the exhaust system as provided in the tune-up specifications, if any. Do not enter if % CO Combined will be entered.
61 -63	IDLE -%CO COMBINED	Enter the percent CO if combined. If percent CO combined is entered, entry of either percent CO right or left will cause a * error. The percent CO provided here is part of the vehicle tune-up specifications.
64 -67	IDLE -RPM (Idle RPM)	Enter the engine idle RPM specification provided in the tune-up specifications. omission of this field, or entry of a value less than 200 or greater than 2500, will generate a * error.
68 -70	IDLE -RPM TOL (Idle RPM	Enter the engine idle RPM tolerance specifications. Entry of a value greater

	Tolerance)	than 200 will cause a * error. If Idle RPM Tolerance cannot be indicated by a single number, leave the field blank and provide the correct specification in the Comments field (e.g., "IDLE RPM TOLERANCE = +50, -100 ") . In this case the processing program will indicate with an asterisk on the output report that the specification can be found in the Comments field.

Column Number	Field Title	Instructions
71	GEAR (Alpha)	Enter the appropriate transmission gear (either 'N' for Neutral, 'D' for Drive, or 'P' for Park) used when measuring engine idle RPM. Entry of a code other than 'N', 'D', or 'P', or omission of the field when Idle RPM I 0, will cause a ** error.
72 -73	ACTIVE YEAR	Leave blank for "new", "correction", and "change" submissions. For "carryover" submissions, enter the year to which the previously generated data will be carried over. For example, if a vehicle first tendered for certification in the 1981 model year (i.e., version number 00, model year 81, active year 81) were to be carried over for model year 1982 certification, then '82' should be entered for the carryover submission. Failure to follow these instructions will cause the VI preprocessor to reject the submission. For further explanation see Section II.B above.
74 -79		Leave blank.
80	(Card Number)	Leave blank if these data are submitted on a hard-copy VI Sheet. Enter '2' if these data are submitted in machine-readable form.

Column Number	Field Title	Instructions
		CARD 3
1 -3	AXLE RATIO	Enter axle ratio rounded to two decimal places. Omission of this field, or entry of values less than 2.00 or greater than 6.00, will cause a ** error.
4 -7	N/V RATIO	Enter the N/V ratio rounded to one decimal place. Omission of this field, or entry of values less than 20.0 or greater than 95.0, will cause a * error.

Column Number	Field Title	Instructions
8	ODOM CODE (Alpha) (Odometer Code)	Enter odometer code (either 'M' for miles or 'K' for kilometers.) Failure to enter one of these codes will generate a * error.
9	A/C (Alpha) (Air Conditioning Installed)	Enter 'Y' or 'N' (Yes or No) to indicate whether the actual test vehicle is equipped with air-conditioning hardware. Failure to enter one of these two codes will generate a * error.
10	EXHAUST CODE	Enter one of the exhaust codes listed below to describe the position(s) of the exhaust tailpipe(s) on the actual test vehicle. 1 Single Left Rear 2 Single Right Rear 3 Dual Rear 4 Single Left Side 5 Single Right Side 6 Dual Sides Failure to enter one of these six codes will generate a * error.
11	CC OODE (Crankcase System Code)	Enter the crankcase system code (either '1' for closed or '9' for other). Failure to enter one of these two codes will generate a * error.

12	TRANS. CONFIG. (Transmission Configuration)	The transmission configuration has been moved to card 5, cols. 53-54 for expansion to 2 digits.

Column Number	Field Title	Instructions
13 -22	TIRE & RIM SIZES (Alpha)	Enter the tire size and rim diameter imprinted on the sidewall by the tire manufacturer (e.g., A-78x13, BR-78x14, 205 70 VR 15, etc.). Failure to enter this data item will cause a ** error.
23 -32	CONTROL SYSTEMS (Exhaust Emission Control Systems)	Enter up to five of the following codes to indicate the vehicle's exhaust emission control systems. Use each code only once; if a vehicle is equipped with two oxidation catalysts, for example, enter the code for oxidation catalyst one time only. 02 Engine Modification 05 Thermal Reactor 08 Exhaust Recycle 10 Air Pump 11 Pulsating Air System 16 Oxidation Catalyst 17 Reduction Catalyst 18 Three-Way Catalyst 19 Closed Loop Control of Air/Fuel Ratio 20 Three-Way Catalyst plus Closed Loop Control of Air/Fuel Ratio 99 Other Indicate the presence of fuel injection with an entry to Card 2, Col. 40. If the vehicle is gasoline and is not equipped with any add-on exhaust emission control systems, including Fuel Injection (Card 2, Col. 40), then the correct entry is 02' (Engine Mod); conversely, if 02 is entered, the entry in the Fuel Injection field must be N,' and no other exhaust emission control system codes may be entered in the Control Systems field (except diesels).

(See Advisory Circular 20-B, Section F.1.)

For diesel vehicles, where the Engine Type (Card 2, Cols. 20-21) is coded '03' (Diesel), the fuel type (Card 3, Cols. 35-36) is coded '09' (Diesel), and the Fuel Injection (Card 2, Col. 40) is coded 'Y' and the vehicle is not equipped with any add-on exhaust emission control systems, this field must have code '02' (Engine Mod).

Column Number	Field Title	Instructions
		Omission of this field, or failure to use codes other than those specified above, will produce a * error. A discrepancy between this field and the corresponding record in the ESI data base will cause a *** error.
33 -34	EVAP. SYS. (Evaporative Emission Control System)	Enter one of the following codes to specify the vehicle's evaporative emission control system. 01 Crankcase 02 Canister 03 Tank 04 None 99 Other Failure to use one of the codes listed above will cause a * error; failure to use Code 04 on a diesel vehicle causes a * error.
35 -36	FUEL TYPE	Enter one of the following codes to specify the fuel used during testing: 06 Indolene Unleaded, 91 Octane (Unleaded Fuel) 09 #2 Fuel Oil (Diesel Fuel) 17 Indolene 15 (Leaded Fuel) Failure to use codes 06 or 17 for gasoline-fueled vehicles or 09 for

		diesel-powered vehicles will produce a ** error.
37 -40	NOMINAL MAIN TANK CAPACITY	Enter the volume, measured in the units specified in Col. 45 of Card 3, of the fuel tank (i.e., the amount of fuel which can be pumped into the tank via the fuel tank filler inlet). Failure to enter this item, or entry of a value less than 5.0 or greater than 99.0, will generate a ** error.
41 -44	NOMINAL AUX. TANK CAPACITY (Nominal Auxiliary Tank Capacity)	Enter the volume, measured in the units specified in Col. 45 of Card 3, of the auxiliary fuel tank. If the vehicle has no auxiliary fuel tank, leave blank. Entry of a value less than 5.0 or greater than 50.0 will generate a * error.

Column Number	Field Title	Instructions
45	UNITS (Units for Tank Capacity)	Enter the appropriate code (either 'G' for gallons or 'L' for liters) which identifies the units of measurement applicable to the preceding two fields. Failure to enter either "G" or "L" will cause a ** error.
46 -57	ENGINE FAMILY (Alpha)	Enter the name of the engine family to which this vehicle belongs. Be sure that this specification is consistent with all other references to this engine family in the ESI Sheet, FEDV packages, the application for certification (e.g., Section 10 or 20), etc. Failure to match the engine family name "registered" in the ESI file will produce a *** error. The 1983 Application Format for Certification of Light-Duty Motor Vehicles explains the construction of EPA's standardized engine family names.
61	SYSTEM NO. (System Number)	Enter the number of the engine-system (entered in the ESI file) to which this

		this vehicle belongs. If this field is left blank on the data sheet, the processing program will automatically assign the value of 1. If a number is entered which cannot be matched to a corresponding record in the ESI file, a *** error will result.
62 -63	SALES CLASS (Alpha)	Enter one of the following codes to indicate which sales class the configuration represented by the test vehicle (not the vehicle's engine family) belongs to: FV -49-State Light-Duty Vehicle CV -California Light-Duty Vehicle BV -50-State Light-Duty Vehicle FT -49-State Light-Duty Truck CT -California Light-Duty Truck BT -50-State Light-Duty Truck Vehicles in 49-State engine families should always be coded FV or FT; vehicles in California-only families should always be coded CV or CT. Vehicles in 50-State families may be assigned either

Column Number	Field Title	Instructions
		49-State, California, or 50-State codes, depending on where the configuration represented is intended for sale. Failure to input one of the above six codes will generate a * error.
64	SHIFT SPD (Shift Speed)	Enter one of the following codes to clarify the shifting procedure to be used during testing. 1 -Shift at 15-25-40 MPH 3 -Do not shift manually (i.e., vehicle is equipped with automatic transmission). 4 -Survey Based Shift Speed 5 -Formula Based Shift Speed 6 -Shift Indicator Light

		The exact shift points should be specified in the Comments -Cards 6, 7, or 8 for codes 4, 5, or 6. Failure to input one of these codes, or a contradiction between the shift speed code and the transmission configuration [(Card 3, Col. 12: e.g., a transmission configuration of 6 (A-3) and a shift speed code of 1 (15-25-40)], will cause a ** error.
65		Leave blank.
66 -79	ENGINE CODE (Alpha)	Enter the Engine Code represented by this vehicle. This specification must be consistent with all other references to this engine code in FEDV packages, the application for certification etc. This field may be left blank, if necessary, on vehicle information submissions describing durability-data vehicles. Failure to enter or to left-justify the field, when the submission describes a certification emission-data or fuel economy data vehicle, causes a * error.
80	[Card Number]	Leave blank if these data are submitted on a hard-copy VI sheet. Enter '3' if these data are submitted in machine-readable form.

Column Number	Field Title	Instructions
		CARD 4
1 -4	DRIVE AXLE WEIGHT FULL TANK (Design Drive Axle Weight Full	Enter the design weight of the vehicle on the drive axle projected with the fuel tank(s) filled to nominal capacity. This measurement must include the weights of all standard equipment (such as spare tire, jack, etc.) and all optional equipment (e.g., air conditioning) installed in accordance with 40 CFR 86.084-24(g). Omission of this field, or entry of a

		value less than 250 or greater than 8000, will produce a ** error.
5 -8	DRIVE AXLE WEIGHT EMPTY TANK (Design Drive Axle Weight Empty Tank)	Enter the design weight of the vehicle on the drive axle projected with the fuel tank(s) empty. Omission of this field, or entry of a value less than 200 or greater than 8000, will produce a ** error.
9 -12	MFR COASTDOWN TIME (SEC) (Manufacturer's Target Coastdown Time Measured in Seconds)	If the vehicle is to be tested using a dynamometer power absorption value derived from a procedure other than a frontal area calculation (e.g., the coastdown procedure described by Advisory Circular No. 55-B, strain-gauged drivetrain, etc.), enter the target coastdown time. Otherwise leave blank. Entry of value less than .01 or greater than 99.0 will produce a * error.
13 -15	TIMING RPM TOL (Timing RPM Tolerance)	Enter the timing RPM tolerance, if appropriate. Entries to this field are understood to be plus or minus an integral number of RPM's, e.g., + 100 RPM's, and refer to the Timing RPM entered in Cols. 51-54, Card 2. (If the tolerance is asymmetrical around the specification--e.g., a timing RPM specification of 600 with tolerances of -25 and +50--leave the field blank and specify the correct tolerances in the Comments [Cards 5-8.]) Entry of a value greater than 200 will produce a * error.

Column Number	Field Title	Instructions
16 -17	TIMING DEGREE TOL (Timing Degree Tolerance)	Enter the timing tolerance in degrees, if appropriate. Entries to this field are understood to be plus or minus an integral number of degrees, e.g., + 2 degrees, and pertain to the IGN. TIM #l and #2, A or B, entries in Cols. 45-51, Card 2. (If the tolerance is asymmetrical

		around the specification, leave the field blank and indicate the tolerances in the Comments.) Entry of a value greater than 3 will generate a * error.
18	TIM-GEAR (Alpha) (Timing-Gear)	Enter the appropriate code ('N','D', 'E', or 'P') indicating if the vehicle's timing should be checked in neutral, a drive gear, either neutral or drive, or park. Failure to enter either 'N', 'D', 'E', or 'P' will generate a ** error assuming that timing can be checked.
19 -21	IDLE CO TOL (Idle CO Tolerance)	Enter the idle CO tolerance, if necessary. Entries to this field are understood to be plus or minus a number of percent CO, specified to a tenth of a percent, e.g., + 1.0% CO. (If the tolerance is asymmetrical around the specification, leave the field blank and indicate the tolerances in the Comments.) This field refers to the %CO LEFT, %CO RIGHT, or %CO COMB entries Cols 55-63, Card 2. If necessary, a minus sign (-) can be entered in Col. 19. Entries of values less than -0.50 or greater than 2.50 will generate a * error.
22 -26	TRANSMISSION CODE (Alpha)	Enter the vehicle's transmission code, if applicable. Otherwise, leave blank. Failure to left-justify this field, if entered, will cause a * error.

Column Number	Field Title	Instructions
27 -40	EVAP EMISSION FAMILY (Alpha) (Evaporative Emission Family)	Enter the name of the evaporative emission family to which this vehicle belongs. This specification must be consistent with all other references to this evaporative emission family in the application for certification. Failure to

		enter and left-justify this field, if the test vehicle is gasoline-fueled, will generate a * error; if the vehicle is diesel-powered, any entry to this field will cause a * error.
41 -48	EVAP EM CODE (Alpha) (Evaporative Emission Code)	Enter the evaporative emission code applicable to this vehicle. This specification must be consistent with all other references to this evaporative emission code in the application for certification. This field may be left blank, if necessary, on vehicle information submissions describing gasoline-fueled durability-data vehicles. Failure to enter and left-justify this field, if the vehicle is a gasoline-fueled emission-data vehicle, will generate a * error; if the vehicle is diesel powered, any entry to this field will cause a * error.

NOTE: Enter the following tire information if the vehicle will be tested at an alternative road-load horsepower setting derived from a procedure other than frontal area calculation. Otherwise leave these fields blank. If a coastdown value is provided in Cols. 9-12, Card 4, failure to supply any of these fields will generate a * error for every item omitted.

49 -59	TIRE MANUFACTURER (Alpha)	Enter the name of the tire manufacturer. Failure to enter a value if coastdown time is entered will result in a * error.

Column Number	Field Title	Instructions
60	CONST (Construction)	Enter one of the following codes that describes most exactly the tire construction: 1 Bias belted 2 Radial 3 Bias

		An invalid value or failure to enter one of these three codes if coastdown time is entered will cause a * error.
61	SW # PLY (Sidewalls: Number of Plies)	Enter the correct number of sidewall plies. Failure to enter a value if coast-down time is entered will cause a * error.
62	SW MAT (Alpha) (Sidewalls: Material)	Enter the alphabetic code which most exactly describes the sidewall materials: A Aramid F Fiberglass N Nylon P Polyester R Rayon S Steel O Other (Specify in "Vehicle Specs. Comments," Cards 6-8) An invalid value or failure to enter one of the above seven codes if coastdown time is entered will cause a * error.
63	BELT # PLY (Belts: Number of Plies)	Indicate the number of plies by entering a numeral (0 to 9).
64	BELT: MAT (Alpha) (Belts: Material)	Enter the alphabetic code which most exactly describes the belt material: A Aramid F Fiberglass N Nylon

Column Number	Field Title	Instructions
		P Polyester R Rayon S Steel O other (Specify in "Vehicle Specs. Comments," Cards 6-8)

		If the tires are equipped with belts of differing materials, describe the two materials and the number of belts in the "Vehicle Specs. Comments" cards (Cards 6-8). An invalid value or failure to enter one of the above seven codes will cause a * error.
65 -66	TIRE PRESSURE: FRONT	Enter the front tire pressure, measured sured in pounds per square inch, recommended for production vehicles. Failure to enter a value if coastdown time is filled out will cause a * error.
67 -68	TIRE PRESSURE: REAR	Enter the rear tire pressure, measured in pounds per square inch, recommended for production vehicles. Failure to enter a value is coastdown time is filled out will cause a * error.
69 -79	RUNNING CHANGE NUMBER	Enter the associated running change request number if this vehicle version represents a configuration that the manufacturer intends to add to a product line by submitting a running change request (i.e., the version either is a new vehicle built and tested in support of a running change request or the version will generate the "after" test results in a before/after (back-to-back) testing sequence). This number should duplicate exactly the contents of the "Request Number" field on the Certification Change Request Form, Card 1R, Cols. 8-18. (This number should not be entered if the version will generate only "before" tests in before/after testing sequences, because this version does not represent the configuration the running change will add to the product line.)

Column Number	Field Title	Instructions

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80	(Card Number)	Leave blank if these data are submitted on a hard-copy VI Sheet. Enter '4' if these data are being submitted in machine readable form.

CARD 5

1 -3	ALT MFR CD (Alternate Manufacturer Code)	If the manufacturer of the durability-data vehicle whose deterioration factors will be applied to this emission-data vehicle's test results is different than the manufacturer of this vehicle, enter the code for the durability-data vehicle's manufacturer. Otherwise leave blank. An entry of a code other than an official EPA manufacturer code will generate a ** error.
4		Leave blank.
5 -20	A PRIMARY DURABILITY VEHICLE ID (Alpha)	Enter the Vehicle Identification Number of the durability-data vehicle whose deterioration factors will be applied to this emission-data vehicle's test results. Even if a manufacturer is running a "back-up" durability-data vehicle to derive deterioration factors from double the normal number of data points, enter the Vehicle ID of the primary durability-data vehicle only.
21	ASN (Assigned Deterioration Factors)	If assigned deterioration factors should be applied to the test results achieved by this emission-data vehicle, enter from the codes below the one which most accurately describes the engine being assigned deterioration factors: (1983 & Earlier -A/C No. 51A) 1 -Gasoline Fueled, Oxidation Catalyst, 4-stroke Reciprocating 2 -Gasoline Fueled, Non-Catalyst, 4-stroke Reciprocating 3 -Diesel Engines 4 -Non-Catalyst Rotary Engines

Column Number	Field Title	Instructions
		(1983 Option-A/C No. 51B) 6 - Gas Fueled, Oxidation Catalyst 7 - Gas Fueled, Non-Catalyst 8 - Diesel Engines 9 - Gas Fueled, 3 Way-Cat (1984 & Later-A/C No. 51B) 1 - Gas Fueled Oxidation Catalyst 2 - Gas Fueled, Non-Catalyst 3 - Gas Fueled 3-Way Catalyst 4 - Diesel Engines Otherwise leave blank. If this field is filled in, Cols. 5-20 of Card 5 should be left blank. If this item is filled in, failure to enter one of the above codes will generate a * error.
22 -23		Leave blank.
24 -39	B PRIMARY DURABILITY VEHICLE ID (Alpha)	As a general rule, leave this field blank. (In certain rare and unusual circumstances, a single version of an emission-data vehicle has been appropriately associated with two different durability-data vehicles. The determination of appropriateness must be made on a case-by-case basis; therefore, consult with your certification team if you believe that you should make use of this field.)
40-41		Leave Blank.
42 -52	ODOMETER CORRECTION	Enter the addition or subtraction sign, initial odometer reading and correction factor. If the sign is '+', the test configuration system miles will be equal to the product of the test odometer reading times the correction factor plus the inital system miles. If the sign is '-', the system miles is equal to the subtraction of the initial odometer reading from the test odometer reading times the correction factor. No entry will cause a * error.

Column Number	Field Title	Instructions
53-54	TRANS CONFIG.	Enter one of the transmission configuration codes to indicate the basic type of transmission, the number of forward gears, the presence of lock-up transmissions, and the presence of creeper years (i.e., 1st gear reductions greater than 5:1). 00 -Manual Four-Speed (Creeper) (1st Gear Reduction 5:1) 02 -Manual Three-Speed 03 -Manual Four-Speed 04 -Manual Five-Speed 05 -Semi-Automatic 06 -Automatic -Three-Speed 07 -Lock-up/Automatic -Three-Speed 08 -Automatic -Four-Speed 09 -Lock-Up/Automatic-Four Speed 10 -Manual Five-Speed (Creeper) 15 -Semi-Automatic Two-Speed 16 -Semi-Automatic Three-Speed 17 -Semi-Automatic Four-Speed 18 -Semi-Automatic Five-Speed Failure to use one of these codes will generate a * error.
55-56, 57-58	TRANS MODIF. (Transmission Modifier)	Enter up to two of the transmission modifier codes to indicate the type of drive system. 01 -Engine Management System 02 -Declutching/Freewheeling 03 -Multimode 04 -Lockup override or variable Lockup Point. The Transmission Modifier codes are defined as follows: 01 -Engine Management System. The Vehicle employs a device which shuts the engine off under certain operating conditions and restarts the engine upon demand. 02 -Declutching/Freewheeling. The vehicle has a device which automatically decouples the drivetrain from the transmission under certain operating conditions or the

transmission from the engine.

Column Number	Field Title	Instructions
		03 -Multimode. For manual transmissions, a vehicle which may be operated as if a multispeed drive axle was installed. For automatic transmissions, a vehicle which has selectable shift points. 04 -Lockup Override or Variable Lockup Point. The vehicle has a user operated device which either prevents lockup from occurring or controls the conditions under which lockup occurs.
60	SIL (Shift Indicator Light)	Enter one of the Shift Indicator Light Codes to indicate the use of the SIL for this configuration. If no entry, the default is '1'. 1 -Not Equipped 2 -Equipped, Not Shifted by SIL 3 -Equipped, Shifted by SIL 4 -Equipped, Data Analytically Adjusted
61 -79		Leave blank.
80	[Card Number]	Leave blank if these data are submitted on a hard-copy VI Sheet. Enter '5' if these data are being submitted in machine-readable form.
		CARDS 6, 7, and 8
1 -79	VEHICLE SPECS. COMMENTS (Alpha) (Vehicle Specifications Comments	Comment here on any unusual characteristics of this vehicle which should be brought to the attention of Certification and Laboratory staff. Such characteristics Might include special shift speeds (see the instructions to the Shift Speed field, Card 3, Col. 64), tolerance specifications which are asymmetrical around a point and cannot be described by the form's established fields (e.g., an idle rpm tolerance of

minus 100 and plus 50 rpm), special ignition timing characteristics, tire construction details not covered by the available codes, the engine rpm at which manually shifted durability vehicles attain rated horsepower, and so forth.

-51- VI SHEET -Card 6, 7, & 8

Such data could be entered as follows:
SHIFT SPEEDS: 5-15-22-35
IDLE CO = 1.5 + 0.5, LOWER LIMIT
SMOOTH IDLE (RAW EMISSIONS)
TIRE BELTS 2R, 2S, 1N.

As is noted in Section II.C above, any change to the Comments field, whether achieved via "Correction," "Change," or "Carryover" submission, automatically "blanks out" all these cards before new comments are entered into the VI file. It is consequently necessary to re-enter all comments that should be preserved from the version on which the change, correction, or carryover is based, as well as to enter the altered comments for the first time.

F. The Vehicles in Data Base Report

The Vehicles in Data Base Report is a partial summary, sorted by manufacturer, Vehicle ID, and version number, of the contents of the Vehicle Information File. Each line of the report reproduces a selection of important fields from each record in the Vehicle Information File. These fields are Internal Vehicle Number (an indexing key that the processing program assigns to each "new" VI submission), Version Number, Manufacturer Code, Vehicle ID, Model Year, Active Year, Axle Ratio, N/V Ratio, Engine Family, Running Change Number, Engine Code, Entry Date (the date the record was first entered in the VI File), the Certification Team (responsible for reviewing the vehicle), the Carryover Pointer (if present, the version number of the unique carryover record based on this record), Vehicle Type, and Critical Errors (the number of one-, two-, and three-star errors discovered in the record by the Star-Check error checking routine).

This summary of data enables a user to know how many versions of each vehicle exist in the data base and normally coveys sufficient information to show how the various versions differ from one another. These data are extremely useful for preparing "change" and "carryover" VI Submissions.

Manufacturers desiring copies of this report are encouraged to request them periodically from their certification teams.

IV. THE MANUFACTURER'S TEST DATA SHEET (APPLICATION FORMAT SECTION 12 or 20)

A. Introduction

The Manufacturer's Test Data Sheet (MTDS: Attachment 9) is used to enter manufacturers' test data into EPA's data base. Processing of the MTDS generates a "Manufacturer's Emission Test Data Report" (a hard copy, reformatted summary of the newly entered data; see Attachment 10), establishes these data as a record in the Manufacturers' Test Data File, and labels the record with an official test number. EPA's computer system also uses the data from all MTDS's submitted on a particular vehicle to compile the Vehicle Test Data Log, which the manufacturer in previous model years prepared, submitted, and updated in hard copy. The manufacturer no longer needs to provide these hard-copy logs separately. (Hard-copy maintenance logs, of course, are still required.)

Since EPA requires complete testing histories of the vehicles that generate certification and fuel economy data, an MTDS should be prepared for every FTP or HWFE test, whether passed, failed, or voided, that is performed on a certification or fuel economy vehicle. (Void test data should include emission values, if available.) The MTDS or its machine-readable equivalent should be air posted or delivered to EPA within 7 working days, as is required by 40 CFR 86.084-26(a)(6)(ii).

There are two exceptions to the policy that all emission and fuel economy test data should be reported. First, if a manufacturer tests a vehicle to provide data for a running change after EPA has established testing requirements, the manufacturer is not required to report the test data if he decides to withdraw the running change application. Second, if a vehicle which undergoes "unofficial" developmental testing does not subsequently generate "official" data to support an EPA-required function (e.g., original certification, a running change application, a general label calculation, etc.), the "unofficial" data need not be reported. If the vehicle does subsequently provide official data, however, then the manufacturer should submit information via the MTDS to account for the intervening unofficial testing. Submission of this information is necessary to maintain the completeness of the vehicle's testing history. Data reporting should begin with the first test that is intended to support certification (e.g., 4,000-mile test for EDV's, 5,000-mile test for DDV's).

The manufacturer need not submit this information on these unofficial tests within 7 days of their generation, and instead may submit the needed information in a package along with the official test data. If these unoffical tests employed the FTP or the HWFE test procedure, a

complete MTDS should be prepared. These data should be coded with a special Test Type (08-Manufacturer's Development Data) entered in Card A,

Cols. 27-28 and associated with the latest current Vehicle Version (Card B, Cols. 14-15). To prevent a proliferation of vehicle versions, new versions should not be created to describe modifications occurring during development testing. Instead, these changes in vehicle parameters and testing conditions should be fully documented in the expanded Comments field (Cards C, D, E, F) for each test.

If an unofficial test was related to emissions testing but did not use the FTP or HWFE test procedure (e.g., the test was conducted for European certification and used a different test procedure), a smaller amount of test data may be submitted. Two input procedures are available, depending on the manufacturer's preference:

l. Enter a brief description of any interim unoffical test or tests in the comment section associated with the next official test to be reported. These comments should indicate the type and purpose of the test(s) performed, the starting system mileage point(s) associated with the test or test series, and the mileage point at which the vehicle resumed mileage accumulation or;

2. Each test, or group of tests sharing an identical test procedure and purpose, can be entered using a separate MTDS. The fields that should be entered are Manufacturer Code, Vehicle ID, Test Date, Test Type of '08', Running Change of 'N', Test Procedure '09' (Manufacturer's Unofficial Test Procedure), System Miles, Odometer Miles, VI Version, and Comments. The Comments field should briefly specify the procedure and purpose of the test conducted; if several tests are being grouped under a single entry, specify the number of tests performed, the starting system mileage point(s) associated with the test or test series, and the system mileage point at which the vehicle resumed mileage accumulation.

Field-by-field instructions for completing the MTDS are provided in Section C below. A special input sheet (Attachment 11) is used to make corrections to the Manufacturer's Test Data File. Instructions for preparing this correction form are supplied in Section III.F below.

B. Error-Checking of MTDS Submissions

Like all VI sheet submissions, MTDS submissions are currently screened by a "preprocessor," which determines if all the key fields (i.e., Mfr. Code, Processing Code, Vehicle ID, Test Type, and Test Proc.) on the input sheets have been filled in, and that no alphabetic characters have been entered into numeric fields. If the preprocessor detects such a mistake, the submission will not be processed further, and an error report identifying the precise input error(s) will be generated and returned to the manufacturer.

The data entry errors which cause the preprocessor to reject a submission are identified in the field-by-field data entry instructions in Section II.E. below. A sample error report is shown in Attachment 12.

If the preprocessor finds no error, the submission receives final processing and the MTDS file is updated.

C. The "Test Type" (Card A, Cols. 27-28) and "Test Procedure" (Card A, Cols. 30-31) Fields

The names of these fields are sufficiently similar in apparent meaning that a manufacturer might assume that the MTDS was requesting the same information in two different fields. The data that should be entered into these fields, however, are entirely different.

"Test Procedure" refers to the testing cycle that has generated the data being submitted on the MTDS. Data derived from the Federal Emission Test Procedure (the "city" test) should be coded 02, while data derived from a Highway Fuel Economy Test should be coded 03. The new test procedure 10 should be used for all Idle CO tests on EDV's or FEDV's. All other test procedures, such as those performed for Japanese or European certification, should be coded 09 (Manufacturer's Unofficial Test Procedure).

"Test type" cannot be described generally and must be explained on a case-by-case basis:

1. Test Type 01: Type 01 should be used for all certification emission-data vehicles, whether they are part of an emission-data fleet supporting original certification or are vehicles whose data support a running change application. "Test type" is essentially independent of "test procedure"; when an emission-data vehicle prior to certification or running change approval receives a highway fuel economy test, the test type is still 01. (Tests performed on certification vehicles after certification or running change approval, requested under authority of 40 CFR Part 600.007 and 600.008, should be coded 31.)

2. Test Type Q2: Type 02 is reserved for certification tests conducted on durability-data vehicles.

3. Test Type 08: Type 08 is reserved for the use of manufacturers' development testing performed prior to generation of "official" test data in support of running change applications or fuel economy reconfigurations. Tests of Type 08 should be associated with the latest current version of the test vehicle, even though the vehicle information record will not be a completely accurate description of the vehicle during development testing. If no current version of the vehicle exists--if the development data were generated on a vehicle never previously used for certification or

fuel economy testing--the tests of Type 08 will have to be linked with the description of Version 00 once it is entered in the data base.

4. Test Type 31: Type 31 is used for tests performed on fuel economy data vehicles--i.e., vehicles whose vehicle type in the Vehicle Information File is 03. This criterion includes: (1) all vehicles originally built and submitted as fuel economy data vehicles and (2) all certification vehicles reconfigured into fuel economy data vehicles and tested to provide data for general label, specific label, or corporate average fuel economy calculation. Note that certification vehicles which, after issuance of certificates or approval of running changes, are retested for fuel economy requirements under authority of 40 CFR Part 600.007 and 600.008, should also be coded 31.

D. The Certification Disposition Codes

In order to function properly, EPA's computer programs must be able to distinguish between apparently similar manufacturer's test data records. For example, the system software needs to differentiate tests which produced passing emission results but were for some reason voided, valid passing tests whose data were eventually superseded by data generated during confirmatory testing, and valid passing tests whose data were ultimately used to support certification. The test disposition codes address these needs; the codes are EPA's mechanism for "labeling" tests and identifying the purposes for which their data will be used.

Starting with the 1981 Model Year, manufacturers should assign disposition codes to all certification tests on durability-data vehicles and to all voided tests conducted on emission-data vehicles (including running change vehicles). The available codes and their meanings for durability-data vehicles, (DDV) are as follows:

l -Pass, Used for Certification of Vehicle (All emission values are less than or equal to the applicable Federal standard. Test data will be used to calculate deterioration factors.)

2 -Pass, Not Used for Certification of Vehicle (All emission values are less than or equal to the applicable Federal standard. Test data will not be used to calculate deterioration factors.)

3 -Fail (At least one emission value is greater than the applicable Federal standard. The test data will not be used to calculate deterioration factors.)

4 -Void (The test and its data should not be used to calculate deterioration factors.)

7 -Fail, Used for Calculation of Deterioration Factor (At least one emission value exceeded the applicable emission standard. Test data nonetheless should be used to calculate deterioration factors.)

8 -Zero-Mile Data, Not Used for Certification (Unless a test is explicitly assigned a disposition of 4 void, all tests showing system miles of 250 or less will be automatically assigned Code 8 by the processing program.)

The only codes available to manufacturers for emission-data vehicles (EDV) and fuel economy data vehicles (FEDV) are:

3 -Fail (At least one emission value is greater than the applicable Federal standard.)

4 -Void (The test was voided and its data should not be used for certification.)

7 -After-Shipment Test (An after-shipment test authorized under Advisory Circular No. 23A.)

8 -Zero-Mile Data, Not Used for Certification

The manufacturers are encouraged to assign Cert Test Dispositions of '3', Fail, '4', Void, '7', After-Shipment and '8', Zero-Mile Data to emission-data vehicle (EDV) and fuel economy data vehicle tests. Manufacturers should assign dispositions to development tests (tests with Test Type 08) and the Idle CO tests (Test Procedure 10).

Manufacturers should be aware that, to prevent the inadvertent modification of official test data, a manufacturer's test data record cannot be modified by a "correction" submission after the record's test disposition code has been assigned. This fact makes the careful prepration of the MTDS or its machine-readable equivalent doubly important.

E. Field-by-Field Instructions

Card A

Column Number	Field Title	Instructions
1 -3	MFR CODE (Manufacturer Code)	Enter the appropriate three-digit manufacturer code listed on the back of the VI Sheet. A blank field or an invalid manufacturer code will cause the MTDS

		preprocessor to reject the submission.
	(Processing Code)	Leave blank. If other than blank or A' (in the case of a correction submission), the MTDS preprocessor will reject the submission.
5 -20	VEHICLE ID (Alpha)	Enter the exact vehicle identification number. This entry must exactly match the corresponding Vehicle ID in the Vehicle Information File. Note that the Vehicle Version (needed to identify the vehicle exactly) must also be entered in Card 2, Cols. 14-15, or the test data cannot be processed. If blank, the MTDS preprocessor will reject the submission.

Column Number	Field Title	Instructions
21 -26	TEST DATE	Enter in MMDDYY form the date that the vehicle was tested; enter leading zeros if necessary. In other words, enter June 4, 1980 as 060480.
27 -28	TEST TYPE	See the discussion in Section IV.B above. If test type is 01 or 31, test procedure must be 02 or 03; if test type is 02, test procedure must be 02: otherwise the MTDS preprocessor will reject the submission.
29	RC (Running Change)(Alpha)	Enter 'B' (before) for the "before" test(s) of running change before/after testing sequences. Enter 'A' (after) for the "after" test(s) of running change before/after testing sequences and for tests on new vehicles built specifically to support running change applications. Enter 'N' (no) otherwise.
30 -31	TEST PROC (Test Procedure)	Enter 02 for Federal Test Procedure, 03 for Highway Fuel Economy Test Procedure, 09 for Manufacturer's Unofficial Test Procedure, or 10 for Idle CO Test Procedure; otherwise the MTDS preprocessor

		will reject the submission. See also Section IV.B above.
32	ACHP (Air Conditioning Horse Power) (Alpha)	Enter 'Y' if ACHP was used for this test (i.e., the dynamometer power absorption setting used for this test included the 10 percent factor for air conditioning). Enter 'N' (no) otherwise.
33 -35		Leave blank.
36 -40	SYSTEM MILES	Enter the system mileage point, rounded to the nearest mile, associated with this test.
41 -46	ODOMETER	Enter the odometer reading, expressed in the same units entered in the corresponding vehicle information record, taken when this test was run.

Column Number	Field Title	Instructions
47	HIGH ALT (High Altitude) (Alpha)	Enter 'Y' (yes) if the test was conducted at high altitude. Enter 'N' (no) otherwise.
48 -52	HC (Hydrocarbon Emissions Value)	Enter the "weighted mass" hydrocarbon emission value, as defined by 40 CFR Part 86.144-78, generated during this test. This value should be rounded to the number of places to the right of the decimal point indicated by expressing the applicable emission standard to three significant figures; see Section I.D above.
53 -56	CO (Carbon Monoxide Emissions Value)	Enter the "weighted mass" carbon monoxide emission value, as defined by 40 CFR Part 86.144-78, generated during this test. This value should be rounded to the number of places to the right of the decimal point indicated by expressing the applicable emission standard to three significant figures; see Section I.D above.
57 -61	C02 (Carbon Dioxide Emis-	Enter the "weighted mass" C02 emission value, as defined by 40 CFR Part 86.144-

	sions Value)	78, generated during this test. This value should be rounded to the nearest whole gram of C02 per mile.
62 -66	NOx (Oxides of Nitrogen Emis-sions Value)	Enter the "weighted mass" NOx emissions value, as defined by 40 CFR Part 86.144-78, generated during this test. This value should be rounded to the number of places to the right of the decimal point indicated by expressing the applicable emission standard to three significant figures; see Section I.D above.
67 -70	EVAP (Evapora-tive Emissions Value)	Enter the total evaporative emissions loss from this test as defined by 40 CFR 86.143-78. This value should be rounded to the number of places to the right of the decimal point indicated by expressing the applicable emission standard to three signficant figures; see Section I.D above.
71		Leave blank.

Column Number	Field Title	Instructions
72 -77	FUEL ECONOMY	Enter either the city or highway fuel economy value depending on the test procedure (Card 1, Cols. 30-31). The number should be rounded to 1 decimal place but may be left unrounded to 4 decimal places.
78	FE DISP (Fuel Economy Disposition Code)	Leave this field blank.
79	CERT DISP (Certification Disposition Code)	For durability-data vehicles, enter the applicable code: l-Pass, Used for Certification of Vehicle (emission values are below the applicable Federal standards and data should be used for deterioration factor calculation) 2-Pass, Not Used for Certification of

Vehicle (emission values are below the Federal standards but data should not be used for deterioration factor calculation)
3-Fail (at least one emission value above the Federal standard; data should not be used for deterioration factor calculation)
4-Void (void test; data not used for deterioration factor calculation)
7-Fail, Used for Calculation of Deterioration Factor (at least one emission value above Federal standard; data should be used for deterioration factor calculation)
8-Zero Mile Test (this code will be automatically assigned to all tests whose System Miles are less than 250)

For emission-data or fuel economy data vehicle tests, enter '3' if at least one emission value is above the applicable standard, '4' if the test was void prime, '7' for an after-shipment test under Advisory Circular No. 23A, or '8' for a zero-mile test. Otherwise leave blank.

Column Number	Field Title	Instructions
80	[Card Number]	If these test data are being submitted in machine-readable form, enter 'A' to provide the card number. Leave blank if these data are being submitted on a hard-copy input sheet.
		Card B
1 -4	BARO HG " (Barometric Pressure)	Enter the barometric pressure in inches of mercury measured at the time of the test. This number should be rounded to 2 decimal places.
5	(None)	Leave blank.
6 -10	NOX-KH	Enter the humidity correction factor (see

	(Oxides of Nitrogen-Humidity Correction Factor)	40 CFR Part 86.144-78) calculated to four decimal places.)
11 -13	AMB TEMP (Ambient Temperature)	Enter the ambient temperature in degrees fahrenheit recorded at the time of the test.
14 -15	VI VER (Vehicle Version)	Enter the Vehicle Version needed to identify this vehicle exactly. (Refer to the Instructions for Vehicle ID, Card 1, Cols 5-20). For new submissions, leaving this field blank will cause the MTDS preprocessor to reject the submission.
16	(None)	Leave blank.
17 -20	DIURNAL	Enter the evaporative emission value attributable to the diurnal breathing loss test (see 40 CFR Part 86.133-78). This value should be rounded to the number of places to the right of the decimal point indicated by expressing the applicable emission standard to three significant figures; see Section I.D above.
21 -24	HOT SOAK	Enter the evaporative emission value attributable to the hot soak test (see 40 CFR Part 86.138-78). This value should be rounded to the number of places to the right

Column Number	Field Title	Instructions
		of the decimal point indicated by expressing the applicable emission standard to three significant figures; see Section I.D above.
25 -26	SOAK PERIOD	Enter the number of hours that elapse between the vehicle preconditioning procedure described in 40 CFR Part 86.132-78 and the cold start exhaust emission test (i.e., the period between "key off; LA4 prep and key on; FTP [or LA4 test]"). This value should be between 12 and 36.

27 -30	COASTDOWN TIME (Seconds)	If appropriate, enter the measured coast-down time derived from the vehicle dynamometer coastdown procedure (the "quickcheck" procedure) outlined in Advisory Circular No. 55-B, Attachment II. Enter only the results of quickchecks whose data confirm the target coastdown times according to the criteria in Section VIII of Advisory Circular No. 55-B; if a quickcheck fails to confirm the target coastdown value, record in the comments the unacceptable coastdown time and, if applicable, that the dynamometer which generated the unacceptable value was different from the dynamometer which generated the acceptable one. Since quickchecks are normally performed after highway fuel economy tests only, this field may be left blank on a data sheet reporting the results of a Federal Test Procedure (city test).
31 -34	IDLE SPEED	Enter the measured idle RPM, as required by 40 CFR 86.142-80(f), associated with this test.
35 -38	PARTICULATES	Enter the "mass of particulate" value, as calculated in 40 CFR 86.145-82, generated during this test. This value should be rounded to the number of places to the right of the decimal point indicated by expressing the applicable emission standard to three significant figures; see section I.D above.

Column Number	Field Title	Instructions
39	AVG CODE	If applicable enter alphabetic character to indicate which tests are to be averaged together; all tests with the same code will be averaged together (Durability-Data Only).
40 -42	TEST LAB CODE	The three digit manufacturer code identifying the laboratory this test was conducted at. For laboratory correlation purposes only. (Should only be filled out

		if specifically requested by EPA).
43-47	IDLE CO,%	Enter the measured percentage of CO at idle. Must be entered with Test Procedure 10 and Test Type 01 or 31.
48 -79		Leave blank.
80	[Card Number]	Leave blank if these data are being submitted on a hard-copy input sheet. If these data are being submitted in machine-readable form, enter 'B.'

- Cards C, D, E, and F

1 -79	COMMENTS (Alpha)	Enter comments which clarify the purpose of this test, but do not repeat information entered elsewhere on this input sheet. To facilitate certification team review, the computer program that generates test data logs automatically insert a line of comments for each test indicating the test type (whether durability-data, emission-data, or fuel economy), the mileage associated with the test, the test procedure (city or highway), the test location (manufacturer's facility or EPA), a void test, and, if applicable, the running change number and type of running change test (back-to-back before test, back-to-back after test, or test on new vehicle). The manufacturer should not enter this information more than once. On the other hand, the manufacturer should indicate why a test was voided, show the relationship of the test point and scheduled or unscheduled maintenance conducted, flag confirmatory tests conducted at the manufacturer's facility, record the results of dynamometer coastdowns ("quick-checks") which do not confirm target coastdown values, etc. Comments on development tests (Test Type 08) should

Column Number	Field Title	Instructions

		explain what modifications to the testing condition and/or the test vehicle were performed before the test. The following abbreviations may be used: BSM Test Before Scheduled Maintenance ASM Test After Scheduled Maintenance BUM Test Before Unscheduled Maintenance AUM Test After Unscheduled Maintenance The following examples should suggest the level of detail desired for void test explanations: EXCESSIVE CRANK TIME DUE TO DRIVER PENDANT MALFUNCTION TEST TERMINATED AT END OF FTP CYCLE: DIURNAL HEAT BUILD OUT OF LIMITS TEST RUN WITH UNREPRESENTATIVE ER78X14 TIRES. The following examples should suggest the level of detail desired for development testing comments: REMOVE FUEL INJECTION PUMP #123, INSTALL FUEL INJECTION PUMP #123-A; SET IDLE TO SPECIFICATIONS. REMOVE 2.76:1.0 AXLE, SPEEDOMETER GEAR; INSTALL 3.07:1.0 AXLE, SPEEDOMETER GEAR.
80	[Card Number]	If these test data are being submitted in machine-readable form, enter 'C', 'D', 'E', or 'F', as appropriate. Leave blank if these data are being submitted on a hard-copy input sheet.

F. Correction Submissions

Corrections to a manufacturer's test data record are made by preparing and submitting an MTDS-like input form called "Manufacturer's Test Data Sheet Corrections Only" (Attachment 11). To prepare this form:

1. Fill in the three fields necessary to identify the record requiring correction: the Manufacturer Code (Card A, Cols. 1-3), the Vehicle ID (Card B, Cols. 5-20), and the Manufacturer's Data Test Number (the five-

digit number, printed on the "Manufacturer's Emission Test Data Report," which the MTDS processing program had previously assigned to the test record needing modification; Card A, Cols. 21-25). Failure to enter test number on correction submissions will cause the MTDS preprocessor to reject the submission.

2. Enter (correctly) the columns requiring modification. If Test Date must be corrected, enter the correct date in Card B, Cols. 74-79. If a column needs to be blanked out, enter an asterisk (*) in that column.

Since EPA's software makes corrections on a column-by-column basis, it is possible to correct one or two characters without changing the entire field. For example, to correct System Miles (Card A, Cols. 36-40) from '10001' to '10005', for instance, enter '5' in Col. 40 or '10005' in Cols. 36-40.

3. Submit the sheet for processing in the usual manner. The processing program will then identify from the 'A' in the Processing Code field (Card A, Col. 4) that the submission is a correction, use the Mfr. Code, Vehicle ID, and Test No. fields to identify the record needing correction, overlay the erroneous data fields of that record with the data entered on the correction input sheet, and generate a new "Manufacturer's Emission Test Data Report" to provide a hard-copy record of the modification.

Manufacturers who wish to submit MTDS corrections in machine-readable form should follow the procedures described above, taking care in addition to enter an 'A' in the Processing Code field (Card A, Column 4) and the appropriate card numbers ('A', 'B', 'C', 'D', 'E', or 'F',) in Column 80 of all cards (or card images) submitted.

G. Exhaust Emission Deterioration Factor Calculations

Observance of the preceding guidelines for submitting manufacturer's test data generated by durability-data vehicles eliminates the need for a separate data submission to support calculation of exhaust emission deterioration factors. These deterioration factors are computed automatically, using the methods of 40 CFR 86.084-28(a), as soon as a durability-data vehicle's 50,000-mile test results have been entered into the data base. Should a technique of calculation other than the fitting a straight line to the data using the method of least squares be required, (such as the one-step function). Contact your certification team representative to initiate appropriate action.

For use of the outlier procedure, a request must be submitted to the certification team representative identifying the category (LDV or LDT) prior to certification of the first engine family within the category as required in 40 CFR 86.084-28(a)(4)(i)(A)(4). Prior to December 2, 1982 the regulations required that the averaging of multiple tests at a test point be done before the outlier procedure. After December 2, 1982 the procedure was reversed requiring the outlier procedure be done prior to average of multiple tests at a test point.

V. THE SUMMARY SHEET INPUT FORM (APPLICATION FORMAT SECTION 16 or 20)

A. Introduction

Completion of a Summary Sheet Input Form (SSF: Attachment 13) is the first step in the preparation of a "Summary Sheet" (Attachment 14), a computer-generated report which displays the essential data supporting (and justifying) the certification of a particular engine family/evaporative emission family combination.

These key data--test vehicle specifications, deterioration factors, test results, calculated certification levels, etc.--are stored in the various computer files of EPA's Light-Duty Motor Vehicle Data Base. Although processing of the SSF establishes a new record in the Summary Sheet Input File and so enters into the data base information not stored elsewhere (e.g., the method used to generate the evaporative emission deterioration factor, a list of all car lines included in the family combination that the summary sheet describes, etc.), most of the data on the SSF function as signals that indicate to a report-generating program which records in other data files need to be accessed and selectively copied to produce the Summary Sheet report. In essence, Summary Sheet processing coordinates and retrieves information dispersed throughout the data base for this reason, the generation of this report provides a useful check that the most critical certification information is complete and in good order. (A data file based on all the Summary Sheets is consequently used as the exclusive information source for the report of certification test results published annually in the Federal Register.) The individual Summary Sheet also serves as a useful reference document, because it describes succinctly how the requirements for certification have been fulfilled by the family combination that the Sheet covers. A completed Summary Sheet is consequently reviewed by the certification team and the Division Director before the Director signs the corresponding certificate of conformity. Since the certificate will not be issued until the Summary Sheet is free of errors, the correct preparation of the SSF, as well as the accuracy of all data retrieved during Summary Sheet processing, is of paramount importance.

Not surprisingly, the structure of the SSF and the Summary Sheet output are closely related. The first line or "Card 1" of the SSF lists the engine

family, evaporative emission family, and manufacturer whose test vehicles the Summary Sheet will describe; these data provide a heading to the first page of the Summary Sheet output. The second section--the "Card 2's"--of the SSF indicates the engine family's durability-data vehicle(s), the evaporative emission family's durability program, and the evaporative emission deterioration factor; this information is also printed on the report's first page. The SSF's Card 3's are used to list the Vehicle ID's of all the emission-data vehicles tested to support the certification of the family combination; the second (and if necessary, the third) page of the report summarizes these vehicles' specifications and the test results they have achieved. The SSF's final section, the "Card 5's", is essentially a list of car line codes; the corresponding page of the report prints all the car lines covered by this family combination. Card 5's are also used

to enter comments pertaining to the entire Summary Sheet report; see pages 79-80 below. A final report page lists any errors encountered during computer processing. (Study of the attached examples of an SSF and a Summary Sheet should make clear the structure and content of these documents.)

B. Which Data and Which Test Vehicles Should the Summary Sheet Cover?

1. Treatment of Failed and Replacement Emission-Data Vehicles on the SSF

40 CFR 86.084-30(b)(4) and the Division Director's letter to industry of December 13, 1979 specify three alternatives available to the manufacturer if one of the emission-data vehicles fails emissions testing. Proper preparation of the SSF depends on which of these options is pursued.

Option A [86.084-30(b)(4)(ii)]. The manufacturer removes the configuration represented by the failed vehicle from the application. To fulfill the requirements of test vehicle selection, the manufacturer selects an additional emission-data vehicle (or vehicles) for testing.

Treatment of Option A on the SSF. The failed vehicle should not appear on the SSF, because it has not generated data supporting the certification. The replacement selection and the test which generated official data should be entered on the SSF.

Option B [86.084-30(b)(4)(iii)]. The manufacturer deletes the failed configuration from the application and adds a configuration not previously included. The failed vehicle may then be modified or recalibrated to this new configuration and tested to demonstrate compliance. A new emission-data vehicle representing the new configuration may be built and tested to show compliance.

Treatment of Option B on the SSF. If a new emission-data vehicle representing the new ("fix") calibration is built and tested to generate official data, that vehicle should be entered on the SSF and the passing test generating official data identified. (The originally failing vehicle, even though modified to pass, should not be entered.) If a new emission-data vehicle is not built, however, then the recalibrated original vehicle and the passing test generating the official data should appear on the SSF.

option C [86.084-30(b)(4)(iv)]. The manufacturer corrects a component or system malfunction and the originally-failed vehicle passes when tested after the component repair. A new emission-data vehicle, of identical configuration to the originally-failed vehicle, must be operated and tested to demonstrate compliance, unless EPA explicitly permits test data to be generated by the originally failed vehicle only.

Treatment of Option C on the SSF. If a new emission-data vehicle is built and tested to generate official data, that vehicle should be entered on the SSF and the passing test identified there. (The repaired, originally-failing vehicle should not be entered.) If a new emission-data vehicle is not built, however, then the repaired original vehicle and the passing test generating the official data should be entered on the SSF.

2. One Summary Sheet for Each Certified Engine Family/Evaporative-Emission Family Combination

A separate summary sheet report should be prepared for each certificate of conformity that a manufacturer requests; furthermore, each Summary Sheet report should independently provide a complete overview of the data supporting the certification of the family combination being described. This requirement necessitates a certain amount of duplication in the Summary Sheet reports, because a manufacturer often uses one engine family (or evaporative emission family) in more than one ultimately certified family combination. For example, assume that a manufacturer wishes to certify two family combinations called A-1 and B-1, which are composed of different engine families (A and B) but a common evaporative emission family (1). The same information pertaining to Evaporative Emission Family 1 must appear on both Summary Sheets; the general principle is that the Summary Sheet report should display complete data on deterioration factors and emissions tests for both the engine family and evaporative emission family of the combination.

The application of this principle to the question of which emission-data vehicles should appear on the Summary Sheet report results in the following rule: the Summary Sheet report should display all emission-data vehicles which were tested to support the certification of either the engine family or the evaporative-emission family which comprise the family combination that the Summary Sheet describes. (The SSF, consequently, must include input data for every emission-data vehicle tested to support

the certification of either the engine family or the evaporative emission family which comprise the family combination submitted for certification.) Conversely, each emission-data vehicle that a manufacturer tests should appear on every Summary Sheet whose family combination includes either the engine family or the evaporative emission family for which the emission-data vehicle generated test data used to support certification.

These rules can be illustrated by extending the clarifying example introduced above. Assume that a manufacturer wishes to certify two family combinations A-1 and B-1, and that the test vehicle requirements for these combinations were as follows:

Engine Family A = two emission-data vehicles: Vehicle #1 tested for exhaust emissions only, Vehicle #2 tested for exhaust emissions and for evaporative emissions in connection with Evaporative Emission Family 1.

Engine Family B = two emission-data vehicles, Vehicle #3 tested for exhaust emissions only, Vehicle #4 tested for exhaust emission and evaporative emission in connection with Evaporative Emission Family 1.

Evaporative Emission Family 1 = two emission-data vehicles: Vehicle #2 tested in connection with Engine Family A, Vehicle $4 tested in connection with Engine Family B.

The Summary Sheet report for Family Combination A-1 should display three emission-data vehicles: Vehicle #1 (tested for Engine Family A), Vehicle #2 (tested for Engine Family A and Evaporative Emission Family 1), and Vehicle #4 (tested to support Evaporative Family 1). The SSF for Family Combination B-1, similarly, should display three vehicles: Vehicle #2 (tested for evaporative emissions only, with respect to this combination), Vehicle #3 (tested for Engine Family B), and Vehicle #4 (tested for Engine Family B and Evaporative Family 1). Note that Vehicle #2 and #4 have different functions with respect to each combination: with respect to one combination the vehicle supports certification of both the engine and evaporative emission families, while with respect to the other combination the vehicle supports the certification of the evaporative emission family only. Since the SSF should show all vehicles supporting certification of the families comprising the combination, it is entirely correct that (in this instance) Vehicles #2 and #4 appear on two different Summary Sheets. Note that correct preparation of an SSF requires that the coding of the Card 3 reflects in the Emission Type field the

certification function of the vehicle with respect to the particular combination (i.e., Vehicle #2 would be coded differently on the SSF describing family combination A-1 than on the SSF describing combination B-1). The data entry instructions in Section V.C below explain in detail the various Emission Types and how they should be coded.

3. Light-Duty Truck Certification Options

Beginning with the 1984 model year, there are three options available in the certification procedures for durability vehicles. These options and the information required are:

Option 1 -Average Useful Life -This option is the same as the original 1984 procedures. The useful life is determined by the manufacturer as defined in the regulations. The durability test points are not to be submitted for processing on the Manufacturers Test Data Sheet. The deterioration factors are to be determined by the manufacturer and submitted to EPA on the Special DF/CSPM Identifier Data Sheet. The Vehicle Information Data Sheet must be entered into the EPA data base before the deterioration factors are submitted.

Option 2 -Assigned Useful Life -me useful life of 12 years and 130,000 miles or other useful life as approved by the Administrator is assigned for the durability. The data submittal requires the durability vehicle information to be entered into the EPA data base on the Vehicle Information Data Sheet. The durability test points for any emission results should not be submitted for processing on the Manufacturers Test Data Sheet. The deterioration factors are to be determined by the manufacturer and submitted to EPA on the Special DF/CSPM Identifier Data Sheet.

Option 3 -Half-Life Useful-Life -The half-life useful-life option for five years and 50,000 miles is the same as 1983 model year with the exception of the new Idle CO test procedure. The durability test points are to be submitted for processing as in the previous year on the Manufacturers Test Data Sheet for all emissions except Idle CO. The Idle CO deterioration factor is to be determined by the manufacturer and submitted on Card 2 of the Summary Sheet Form.

C. Field-by-Field Instructions

Card 1 -General Engine Family/Evaporative Family Information

Column Number	Field Title	Instructions

1 -16	Engine Family (Alpha)	Enter the name of the engine family to be covered by the certificate corresponding to this SSF.
18 -20	Mfr. Code (Vehicle)	Enter the three-digit Manufacturer Code which specifies the manufacturer of the vehicles covered by this SSF. (Manufacturer Codes are printed on the back of the Vehicle Information Data Sheet.)
21 -23	Mfr. Code (Engine)	Enter the three-digit Manufacturer Code which specifies the manufacturer of the engines used in the vehicles covered by this SSF. (Manufacturer Codes are printed on the back of the Vehicle Information Data Sheet.)
24	SYS NO. (System Number)	Enter the one-digit System Number corresponding to the engine system combination identified in the Engine System Information data base for the engine family being covered by this SSF. If not entered, the default value is '1'.

Column Number	Field Title	Instructions
62 -78	Evaporative Emission Family (Alpha)	Enter the name of the evaporative emission family to be covered by the certificate corresponding to this SSF.
79	ALT (Altitude)	Enter one-digit code to indicate altitude for engine/evap family being certified. This entry will determine the altitude information to be printed on the certificate. Enter one of the following codes: '1' -Low Altitude Only '2' -High Altitude Only '3' -High and Low Altitude If not entered, an error message will be generated.

80	[Card Number]	Leave blank if these data are submitted on a hard-copy SSF. Enter '1' if these data are submitted in machine-readable form.

Card 2 -Deterioration Factor Information

Note: The Card 2's of the Summary Sheet Input Form perform two main functions: (1) they enable the program to retrieve and display all d.f. values used to calculate the family combination's certification levels and to indicate the methods by which these d.f. values were obtained; and (2) they provide through the D.F. Code (Col. 19) a means of linking the Card 2's with the Card 3's, and thus associating the family combination's emission-data vehicles (listed in the Card 3's) with their correct deterioration factors (explicitly listed in or indicated by the Card 2's).

A sufficient number of Card 2's must be filled out to account for all the d.f.'s that pertain to both the engine family and the evaporative emission family covered by this SSF. At least one Card 2 must be filled out, consequently, for each Summary Sheet Input form; a single Card 2 would be appropriate when both exhaust and evaporative d.f.'s are assigned or when the running of a single 50K durability-data vehicle generated both exhaust and evaporative d.f.'s. Most often two Card 2's will be appropriate--one for the

50K durability vehicle that has generated the exhaust d.f.'s, and another for the bench test or other manufacturer-determined procedure that furnished the evaporative d.f. A (theoretical) extreme case family combination containing two exhaust emission control systems and three bench-tested evaporative emission control systems would require five Card 2's; a second SSF would be needed to enter the two Card 2's that could not be included on the first sheet.

The information that each Card 2 must contain varies according to (1) the type of d.f. being described and/or retrieved (i.e., exhaust d.f., evaporative d.f., or both; or special d.f. for Idle CO; this information is expressed by the D.F. Type Col. 18) and (2) the durability testing procedure used (e.g., the running of a durability-data vehicle to 50,000 miles, or useful-life miles, bench testing, the aggregating of data drawn from several vehicles, etc.) to generate the d.f. values. Six different combinations of d.f. types and durability testing procedures--and hence five different Card 2 formats -occur in practice. Their differing requirements are set forth in the following table: an "X" indicates that a data field must be filled in, while a blank space indicates that a field must be left blank. The correct values for Assigned D.F. (Col. 17) and D.F. Type (Col. 18) have been indicated explicitly.

For light-duty trucks (gasoline only) the deterioration factor for Idle CO must be identified. There are three ways of identifying this data:

1. DF entered on SSF; d.f. is determined by the manfacturer and entered in columns 38-41.

2. Assigned D.F.; the assigned d.f. applies to all emissions when identified in columns 1 and 17.

3. The durability vehicle entered has exhaust and Idle CO d.f.'s which were previously processed through the Special D.F./CSPM Identifier system.

Data-Input Requirements for All Card 2 Types

(For LDT)

	Durability Vehicle I.D Cols. 1-16	Assigned D.F. Type Col. 17	Col. 18	D.F. Code Col. 19	D.F. Value d.f. Col. 20-36	Evap. D.F. d.f. Col. 38-41	Idle CO Col.42-79	Evap Comments
Type of Card 2								
l. 50K Durability Vehicle, exhaust d.f. only	X		1	X	x1			
2. 50K Durability Vehicle, both exhaust and evap. d.f.s	X		2	X	x			
3. 50K Durability Vehicle, evap. d.f. only	X		3	X				
4. Mfr. specified evap. d.f. procedure, evap. d.f. only			3	X	X	X	X	
5. Assigned D.F.'s, exhaust, evap, Idle CO (if gasoline truck)	X (a single assigned d.f. code in Col.l)	*	2	X				

6. Special d.f. for Idle CO d.f.	X		4	X

1 -For LDT only.

Card 2's should not be entered for any deterioration factors other than the exhaust d.f.(s), evaporative d.f.(s) and idle CO d.f.(s) explicitly covered by this Summary Sheet. It is not necessary, for example, to enter Card 2's for those durability-data vehicles which provide exhaust d.f.'s for a combination's "evap./exhaust" emission-data vehicles. ("Evap./exhaust" data vehicles generate test data which support the certification of the combination's evaporative emission family but not the certification of the combination's engine family; for a complete definition, see the instructions to Card 3 below.) Evap./exhaust vehicles belong to the evaporative emission family covered by the summary sheet in question, but, as a rule, to a different exhaust family; since these vehicles' exhaust d.f.'s are also different from those of the Summary Sheet's engine family/evaporative emission family combination, Card 2's for these d.f.'s should not be entered. (The computer will trace down these d.f.'s, which are required for calculation of certification levels, by searching the Vehicle Information and Deterioration Factor files by use of the Primary Durability Vehicle ID.)

Column Number	Field Title	Instructions
1 -16	Durability Vehicle ID (Alpha)	For each family-system combination covered by this Summary Sheet, whose d.f.(s) was (were) obtained by running and testing a 50K durability-data vehicle, enter the VID of the appropriate durability-data vehicle. If two vehicles were run to 50,000 miles to generate twice the customary number of data points, enter the VID of the vehicle identified as "Vehicle I.D. 1st Car" on the "19__ Deterioration Factors" report. (Note that the VI record for the durability-data vehicle identified here must have an "active year" equal to the "model year" of the certificate being applied for.) For LDT, if this Card 2 is to represent a special D.F. entry for the exhaust emissions and Idle CO D.F., enter the durability vehicle ID.

		If this Card 2 is to indicate the use of assigned d.f.'s, enter one of the following codes in Column 1: (1983 & Earlier-A4C No. 51A) 1 -gas fueled, oxidation, catalyst four stroke reciprocating 2 -gas fueled non-catalyst, four stroke reciprocating 3 -diesel engines 4 -non-catalyst rotary engines

Column Number	Field Title	Instructions
		(1983 Option-A/C No. 51B) 6 -gas fueled, oxidation catalyst 7 -gas fueled, non-catalyst 8 -diesel engines 9 -gas fueled, 3-way catalyst (1984 & Later-A4C No. 51B) 1 -gas fueled, oxidation catalyst 2 -gas fueled, non-catalyst 3 -gas fueled, 3-way catalyst 4 -diesel engines If this Card 2 is to indicate an evaporative emission d.f. generated by a manufacturer-developed durability procedure, leave this field blank.
17	Assgn DF (Assigned D.F.) (Alpha)	If a combination is assigned deterioration factors, enter an asterisk (*) in Col. 17. Make sure that one of the above single-digit assigned d.f. codes is entered in Col. 1.
18	D.F. Type	Enter the appropriate code: 1 -the durability-data vehicle was run to obtain exhaust d.f.'s (including Particulates if diesel) for this family combination. (In this case only Cols. 1-19 should be filled out. Information about evap.--Cols. 20-79--should be left blank. An

exhaust durability-data vehicle which has generated an evap. d.f. for an evap. family other than the one included in this Sheet's engine family/evaporative emission family combination has a D.F. Type of 1 with respect to this input form.)

For LDT, the exhaust d.f.'s are determined from the 50K vehicles test points entered into the EPA data base and the Idle CO d.f. is supplied by the manufacturer. Columns 1-19 and 38-41 should be completed.

Column Number	Field Title	Instructions

2 -the durability-data vehicle was run to obtain both exhaust and evap. d.f.s. (including Particulates if diesel) for this family combination, or both exhaust and evap. d.f.'s were assigned. (Only Cols. 1-19 should be filled out.)

For LDT, the exhaust and Evap d.f.'s are determined from the 50K vehicles test points entered into the EPA data base and the Idle CO d.f. is supplied by the manufacturer. Columns 1-19 and 38-41 should be completed.

3 -a durability-data vehicle, bench testing, or some other test procedure was used to obtain the evap. d.f. for this family combination. (If a 50K durability-data vehicle has generated the evap. d.f., complete Cols. 1-19 only. If an alternative manufacturer-developed durability procedure was used, leave blank Cols. 1-17 but complete Cols. 19-79. An evaporative emission durability-data vehicle which has obtained exhaust d.f.'s for an engine family other than

the one covered by this sheet's engine family/evaporative emission family combination has a D.F. Type of 3 with respect to this input form.)

4 -For LDT, the durability vehicle entered has exhaust and Idle CO deterioration factors entered into the EPA deterioration factor data base through the Special D.F. processing. (This d.f. type is for use with the Light-Duty Truck options for Average Useful-Life and Assigned Useful-Life).

Column Number	Field Title	Instructions
19	D.F. Code	Assign a code number from 1 to 9 to each Card 2; enter "1" for the first Card 2, "2" for the second, etc. (This code links together the durability data and deterioration factors with the appropriate emission-data vehicles listed by the Card 3's. Please refer to the Exhaust D.F. Code and Evap. D.F. Code instructions for Card 3 below.)

(Note: The following four fields (plus Evap or Bench Test Comments) should be entered only if the D.F. Type [Col. 18] is 3.)

21-24 (Col. 20)	Evap. D.F.	Enter the evaporative emission deterioration factor. A negative value is permissible and should be recorded, even though this value will be rounded to zero for the calculation of certification levels. The negative sign should be entered in Col. 21 or, if necessary, in Col. 20.
26	Bench	Enter 'Y' if the evap. d.f. was derived from a bench test. Enter 'N' otherwise.
28 -31	4K Mile Value	Enter, if available, the 4K evaporative emissions value, whether obtained by direct measurement, extrapolation,

interpolation, or whatever.

Column Number	Field Title	Instructions
33 -36	50K Mile Value	Enter, if available, the 50K mile evaporative emission value, whether obtained by direct measurement, extrapolation, interpolation, or whatever.
38-41	Idle CO D.F.	For LDT (gasoline only), enter the Idle CO D.F. determined by the manufacturer.
42 -79	Evap. or Bench Test Comments (Alpha)	Enter evaporative control system comments e.g., "Purge Control Canister-Cont. System 1B3C," if Bench code (Col. 26) is N.' Enter bench test comments, e.g., "Bench Aged Components Tested on Vehicle," if Bench Code is 'Y'. The comments are limited to each card 2 entry and should not be carried to the next card 2.
80	(Card Number)	Leave blank if these data are submitted on a hard-copy SSF. Enter '2' if these data are submitted in machine-readable form.

Card 3 -Emission Data Information

Note: The Card 3's enable the Summary Sheet's processing program to retrieve and display selected information, including all official test results, on all emission-data vehicles that support the certification of the engine family/evaporative emission combination. Each Card 3 has space for the entry of data for three different test vehicles; if more than 9 emission-data vehicles were used to support the certification of this family combination, simply attach an additional summary sheet form and fill out on it the additional Card 3's needed.

Needless to say, it is crucial that all relevant emission-data vehicles be listed on the Card 3's. Be particularly careful not to overlook vehicles whose evaporative emissions tests support the certification of this Sheet's evaporative emission family, but which belong to a different engine family than the one covered by the Sheet. If a particular emission-data vehicle was tested twice (e.g., to represent different configurations) to support certification, it should be entered twice on the Card 3's.

Column Number	Field Title	Instructions
1 -16, 27 -42, 53 -58	E.D. Vehicle ID (Alpha)	Enter the emission-data vehicle ID number exactly as it appears on the Vehicle Information Data Sheet for that vehicle. (The "Active Year" of this vehicle or vehicle version must be equal to the model year which the certificate will cover.)
17, 43, 60	Em. Type (Emission Type)	Enter Code 1, 2, 3, or 4 to identify the role the emission-data vehicle plays in support of the certification of this engine family/evaporative emission family combination. 1 -exhaust only. (This vehicle supports the certification of only the engine family of the Sheet's combination. The vehicle may belong to an evaporative emission family other than the one covered by this input form, or the vehicle may simply not have been tested for evaporative emissions. An entry will consequently have to be made under Exhaust D.F.C. (Cols. 24, 50, or 76), but Evap. D.F.C. (Cols. 25, 51, and 77) should be left blank.) 2 -exhaust/evap. (The vehicle belongs to both the engine and evaporative emission families of the family combination, and the results of both exhaust and evaporative emission tests were used for certification. Both Exhaust D.F. and Evap. D.F. Codes will have to be supplied.)

Column Number	Field Title	Instructions
		. (The vehicle belongs to the evaporative emission family of the sheet's engine family/evaporative emission family combination, but it either belongs to a different engine family or, rarely, its exhaust test results were not used to support certification. Only if this latter case applies should entries be made in both the Exhaust D.F. and Evap. D.F. Code columns; if the evap./ exhaust vehicle belongs to an engine family not represented by this summary sheet, the Exhaust D.F. Code should be left blank and only the Evap. D.F. Code entered.) 4-Idle CO. The vehicle belongs to the LDT engine and/or evaporative emission family being certified. For each major configuration of a vehicle being used for certification, an Idle CO test must exist. The Test Type must be 01 and the test procedure must be 10. This emission type is to be used with Card 2 D.F. Types 1, 2 and 4. The EXH DFC must be entered and the EVP DFC left blank.
18 -23, 44 -49, 70 -75	Test No. (Test Number)	Test number can be either 1) the official test number of an EPA confirmatory test or 2) the test number assigned to a manufacturer's test by processing of a Manufacturer's Test Data Sheet.
24, 50, 76	Exh DFC (Exhaust D.F. Code)	Identify the Card 2('s) and deterioration factor(s) that should be associated with each emission-data vehicle by entering in the appropriate Exh DFC and Evap DFC fields the same D.F. Code number(s) (Card 2, Col. 19) used in the description of the corresponding durability-data vehicle(s)
25, 51, 77	Evap DFC (Evaporative D.F. Code)	

Column Number	Field Title	Instructions
		and/or evaporative durability testing procedures. For example, if all the exhaust d.f.'s for a combination were provided by a durability-data vehicle identified with a D.F. Code of 1, then every exhaust only or exhaust/evap. emission-data vehicle in the family combination should also have an Exhaust D.F. Code of 1. Note that all "exh only" data vehicles should have an Exh D.F. code and no Evap D.F. code; all "Exh/evap" vehicles should have both an Exh D.F. and an Evap D.F. code; and virtually all evap/exh vehicles should have no Exh D.F. Code and an Evap D.F. code. (An evap/exh vehicle which belongs to the same engine and evaporative emission family as those on the SSF but whose evaporative emission result only was used to support certification should have both Exh and Evap D.F. Codes filled in.) In the frequent case where a combination should have two Card 2's, with the first (D.F. Code of 1) repre-senting an exhaust durability vehicle and the second (D.F. Code of 2) repre-senting a manufacturer's developed evap. D.F., the correct Exh DFC -Evap DFC codings would be: exh only emission-data vehicle = l-blank exh/evap emission-data vehicle = 1-2 evap/exh emission-data vehicle = blank-2 For Idle CO on LDT families, enter the EXH DFC code which matches the Card 2 DFC.
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Column Number	Field Title	Instructions

26, 52 and 78 -	Match (Engine Family Match Override) (Alpha)	One of the error checks performed by the Summary Sheet processing program is a check of the engine family of each exhaust only and exhaust/evaporative emission-data vehicle listed in the Card 3's against the engine family of the exhaust durability-data vehicle listed in the Card 2's. In general, of course, the engine family of durability-data and emission-data vehicle should be identical, but in rare cases (e.g., the carryacross of durability data from a light-duty vehicle to a light-duty truck family) a discrepancy is permissible and correct. In such a case, enter an asterisk in Column 26, 52, or 78 as appropriate to override the error check. The processing program will then use the first durability-data vehicle which appears on the emission-data vehicle's V.I. Sheet (under Primary Durability Vehicle ID, Card 5, Cols. 5-20), regardless of whether its engine family designation matches the emission-data vehicle's engine family designation. If this override is not necessary, leave this field blank.
80	(Card Number)	Leave blank if these data are submitted on a hard-copy SSF. Enter '3' if these data are submitted in machine-readable form.

Card 5 -Car Lines Covered and Comments

The summary sheet processing program can accept two types of Card 5's: "Car Line Card 5's" to specify a car line to be covered by this certificate, and "Comment Card 5's" to enter a line of general comments on this family combination's certification history.

Each Car Line Card 5 consists of three fields: one to enter a car line code, one to indicate the presence of California sales, and one (preprinted on the SSF) to identify the card number. A Car Line Card 5 can apply to either 49-state or California sales, but not both; if a car line is intended for sale in all 50 states, therefore, is is necessary to complete two Card 5's, one to cover the 49-state vehicles and the other to account for the

California vehicles.

l -5	Car Line	Enter one of the 4 or 5-digit car line codes that corresponds to one of the car lines covered by this certificate. (Manufacturers have already received their car line code listings from the Fuel Economy Group.) Right justify if necessary.
55	Cal. Sls (California Sales)	If the car line is projected to be sold in California, enter a plus sign (+) in this column. Otherwise leave blank.
80	(Card Number)	Leave blank if these data are submitted on a hard-copy SSF. Enter '5' if these data are submitted in machine-readable form.

If page 1 of the SSF does not include sufficient space to enter all necessary car lines, prepare and attach page 2. Page 2 should also be used to enter Comment Card 5's, which may be provided to assist EPA review and to document exceptional events or procedures followed during the certification process (e.g., carry-across of data, special techniques for calculating deterioration factors, etc.). These comments will be printed at the bottom of page 1 of the Summary Sheet Report.

The Comment Card 5 consists of three fields: a comment-identifying field of five asterisks (*****) in Columns 1-5; an alphanumeric field for the comments themselves (Cols. 6-79); and a field for the card number (Col. 80). (The comment-identifying asterisks and the card number are preprinted on page 2 of the SSF.) Enter and left-justify the comments in Cols. 6-79; up to five lines of comments may be entered. If the Summary Sheet is being submitted in machine-readable form, enter also the five asterisks in Cols. 1-5 and a 5'--the card number--in Col. 80.

D. Correction Submissions

Two procedures are available for making corrections to Summary Sheet reports. The first requires the interpretation of a computer-generated listing of the input data entered on an SSF (or group of SSF's), while the

second employs a special "correction" SSF. The procedure using the computer

listing is somewhat more difficult to execute than the one involving the separate input form, but it requires less data-entry effort; it has been designed for users with a significant volume of Summary Sheet corrections. The procedure that employs the SSF correction form is simpler to master, but each correction requires preparation of a separate form and manual identification of the record being corrected. This procedure is intended for the manufacturer with only a small number of Summary Sheets to correct, or for any manufacturer who prefers dealing with a user-oriented input form.

1. Using the "Certification Summary Cards 1, 2, 3, 5" Listing to Make Summary Sheet Corrections.

Processing of an SSF generates, in addition to the output report, a computer-printed listing or "echo" of the contents of the input data sheet (or group of input data sheets). (See Attachment 15 for an example of this document.)

This listing number of lines of data, each of which reproduces the contents of one of the input cards of the SSF. Because these lines of data are not divided into fields--in other words, the various data elements "run together" in a character string--the line cannot be analyzed or understood independent of the format of the SSF. To assist comparison between the listing and the SSF, the data lines are arrayed on the listing between two horizontal, parallel lines of the following form:

```
....+....I....+....I....+....I....+....I....+....I....+....I....+....I....+....I
         10        20        30        40        50        60        70        80
```

These numbers correspond exactly to the column numbers of the SSF, and so can be employed to determine the card type or the content of a data field of any line of the listing. For example, for line number 203201.011 of the listing shown in Appendix 14, the Card Number in Column 80 is 2, so Columns 1-16 contain--just as column 1-16 of Card 2 of the SSF contain--Durability-Data Vehicle ID. The 1, 2, 3, and 5 listing differs from the SSF only with respect to the Card 3's: while the SSF permits the entry of data identifying three emission-data vehicle tests in a single card, the 1, 2, 3, and 5 Card Listing allocates a separate line of the listing to each emission-data vehicle/test number entered. (In the card listing, therefore, Columns 27 through 79 of Card 3's will always be blank.)

When making corrections, of course, care must be taken to identify exactly which columns on the input listings are erroneous, and to indicate distinctly how the correction must be made.

To make corrections, the manufacturer should simply resubmit a Manufacturer's Job Request and the input listing, with the necessary corrections, additions, or deletions marked in colored pen or pencil, to the Certification team member or to the Data Operations window. The modified SSF will then be reprocessed and the outputs returned to the manufacturer by the team member.

2. Using the "Correction SSF" to Make Summary sheet Corrections.

Alternately, the manufacturer may initiate the correction process by preparing a Summary Sheet Correction form (see Appendix 16 for sample copy). Preparation of the form entails (1) identifying the Summary Sheet to be corrected; (2) specifying the type of correction that needs to be made; and (3) entering the correct data.

a. Identifying the Summary Sheet record to be corrected.

Enter in the top section of the form the Summary Sheet Index Number (printed on the top of the Summary Sheet report), the Engine Family, and the Evaporative Emission Family, and check off either LDV (Light-Duty Vehicle), LDT (Light-Duty Truck), LDDV (Light-Duty Diesel Vehicle), or LDDT (Light-Duty Diesel Truck).

b. Specifying the type of correction required.

Reprocessing: Reprocessing is required if a Summary Sheet error is not attributable to erroneous completion of the SSF, but to an error in one of the data files which support the Summary Sheet's generation (Vehicle Information, Manufacturer's Test Data, etc.) If a Summary Sheet indicates an axle ratio for a particular emission-data vehicle which is known to be incorrect, a correction would first have to be made to the Vehicle Information record for the particular test vehicle. The Summary Sheet would then have to be reprocessed to transfer the newly corrected information on the vehicle onto the Summary Sheet report. No entry to the correction entry form would be required other than checking the reprocess box and entering the identifying data mentioned above.

Reprocess and insert: If it is necessary to simply add a car line or the results of additional testing to the Summary Sheet report, check the "reprocess and insert" box.

Special instructions: Most other corrections, such as a change in comments, a correction of an evaporative emission deterioration factor, or an insertion and a deletion of a car line, require an indication in the "See Special Instructions Below" box. The change should be explained in the "Special Instructions" section at the bottom of the correction input form.

c. Entering the correct data.

The procedures for filling out each field have been provided in Section V.C above, and these instructions apply to corrections as well. If data must be deleted, make sure that the information to be eliminated has been clearly identified on the input form. To assure that the goal of the correction submission is apparent, enter (correctly) the entire card when a portion of a card must be changed and assure that the special instructions are clear and complete.

E. Updating Summary Sheets to Reflect Additions of Models

Although the manufacturer may use the running change process to modify a previously certified family combination, a running change does not affect the Summary Sheet report unless it adds a previously uncertified car line to the combination. In this case, all affected Summary Sheets should be updated to reflect the addition of model. To perform these updates,

1) add as many Card 5's as are needed to identify the additional car lines covered; and, if appropriate,

2) add as many Card 3's as are needed to identify the tests whose data supported the addition of the model. If a back-to-back testing sequence provided data, identify only the "after" test; if a new emission-data vehicle provided data, identify only the official test.

VI. THE CERTIFICATION CHANGE REQUEST FORM

A. Background

The Certification Change Request Form and corresponding computer programs were revised as of January 1983. The revised form is upward compatible with the previous form dated July 1981. That is, either the January 1983 or July 1981 may be used. However, the new form is easier to use and fewer input errors should occur.

The revisions clarified certain data fields and codes, removed some fields which are no longer required and streamlined the data entry and error checking process.

All manufacturers' change requests should be accompanied by a completed change request form. This form allows the change request data to be entered directly into the light-duty certification data base. Information pertaining to vehicle information and test data will be electronically assembled into a computer generated change report which will speed EPA certification team review of the change request.

B. Procedure

This form is to be submitted by the manufacturers for each change request. The form is also to be used by small-volume manufacturers to submit change notifications which are specified in 40 CFR 86.082-14. A change request can be for a running change, a field fix, or an addition of a model. Also, the change request can be updated or corrected by resubmitting the entire change request form.

The data and information on the change request form will become part of the certification light-duty data base. Appropriate vehicle information and test data results must exist in the certification light-duty data base prior to submission of the change request form.

The change request form may be submitted as a data sheet, data cards or electronically.

C. Card/Record Numbering

All cards and records must be identified in columns one and two. There are six card types numbered one through six. The card type number appears in column one. Each card type also has a record sequence letter in column two. The sequence letter is a R for card type one and letters A through F in alphabetical order with each card types 2, 3, 5, and 6 and letters A through O with card type 4. Do not include cards/ records which

have no data entered on the record other than columns one and two. Do not exceed the maximum number of record sequence letters within any one card type (see data form).

Remember, all card/records submitted to EPA must have the proper card type number and record sequence letter in columns one and two. These numbers and letters are preprinted on the data form. Keypunched and electronically submitted data must have columns one and two entered by the manufacturer.

D. Updates and Corrections

When a change request form is originally submitted, the update code on card/record 1R should indicate N for "no update." When the original change request is processed by EPA's computer programs these new data are stored in the change request data base under the request number found on card/record 1R.

Occasionally, it may be necessary for the manufacturer to update or correct a previously processed change request. A correction may be necessary

due to incorrect or missing data items. An update would be due to the availability of additional information since the original submission of the change request. For example, supporting tests after the change request is submitted, would require resubmission of the data forms as an update. In either the correction or update case these data are treated the same by EPA's computer programs.

To enter a correction/update be sure to fill in all fields. An update/correction is processed by deleting all old information under the "request number" and replacing it with the new or corrected information supplied on the updated form. For this reason it is important to resubmit all data pertaining to this request number by completely filling out the change request form with the proper request number, update code, all unchanged old data, all corrections, and all additional data.

Only the updated/corrected data will be found in the resultant EPA change request data base.

E. Field-by-Field Instructions

The back of the change request form indicates the proper codes for filling out fields requiring a value. A detailed description of all fields follows:

NOTE: Right justify all numeric fields, left justify all alpha-numeric fields. Alpha-numeric fields will be prefaced with an '*' below.

Card/Record: 1R (one card only)

Column Number	Field Title	Instructions
1-2	Card Type/Record Sequence	Required entry of "1R".
3-4	MOD. YR. (model year)	Enter the last two digits of the model year pertaining to this change request. For running changes model year must be 82 or later, for Field fixes 81 or later.
5-7	MFR (Manufacturer Code)	Enter the appropriate three-digit manufacturer code listed

		on the back of the Vehicle Information Data Sheet. This is a required field for all entries and updates/ corrections.
8-18	* REQUEST NUMBER (change number)	Enter a unique change request number to be used as a key field in identifying this change request. This number must be entered exactly the same on this change request form as on any associated Vehicle Information (VI) data sheets card 4 column 69-79. Caution must be used in entering this number. If this request is an update an invalid entry of request number could lead to the wrong change request being deleted from the data base.
19	UPDATE	Enter: 'Y' for yes, this is an update or correction; blank or 'N' for no, this is not an update but an original submission of the change request form. (Also see the back of the form.)

NOTE: A change request applies to an engine family/evaporative family combination. Carefully enter the two following data fields.

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Column Number	Field Title	Instructions
20-31	* ENGINE FAMILY NAME	Enter the standardized engine family name of the family which is to be modified by this change request. The engine family name must coincide exactly with the engine family

name found in ESI (Engine System Information).

If the word "ALL" is entered, left justified for this field, then all engine families for the manufacturer within a single vehicle class which are in the system at this time (see column 57 of this card) are covered by this change request.

The entries in the related fields of "Evap Family Name" on card/record 1R, "Engine Code" and "EVAP Code" on card/records 4A-0 will either expand or restrict the coverage of an "All" for engine family with respect to this change request.

"All" entered for this field does not imply "All" for the related fields.

32-45 * EVAP FAMILY NAME

Enter the name of the evaporative emission family which applies to this change request and engine family combination. The evap family name must coincide exactly with the evap family name found in VI (Vehicle Information).

If the word "All" is entered, left justified for this field, then all evap families for the manufacturer within a single vehicle class are covered by this change request.

The entries in the related fields of "Evap Family Name" on card/record 1R, "Engine Code," and "Evap Code" on card/records

Column

Number	Field Title	Instructions
		4A-0 will either expand or restrict the coverage of an "All" for Evap Family with respect to this change request. "ALL" entered for this field does not imply "ALL" for the related fields.
46-48	CHANGE TYPE	Place an "X" in the appropriate field(s): RC = Running Change FF = Field Fix AM = Addition of Model
50-55	DATE SUBMITTED TO EPA	Enter the date the change request was originally submitted to EPA. If this is an update then enter the date the update was submitted to EPA. Enter date as month, day, year.
57	VEHICLE CLASS	Enter the appropriate code for vehicle class, within this manufacturer that the change request covers. (See back of form for codes.)
59-64	PRODUCTION DATE	Enter the scheduled production date for the start of this change request. This change request will apply to engine family/evap family combinations shown on this record which have been certified by this production date. Enter the date as month, day, year.
65	ALTERNATE PROCEDURE	Enter the appropriate code; Y-yes, N-no, S-small-volume manufacturer. Yes means that the request is submitted under the provisions of 40 CFR 86.082-34. No means that the request is not submitted under these provisions. S means that the notification is submitted

Column Number	Field Title	Instructions
		under the small-volume manufacturer provisions of 40 CFR 86.082-14. If field is left blank, the default value of "Y" will be assigned.
		Card/Records: 2A to 2C (three cards maximum)
1-2	Card Type/Record Sequence	Required entry of card types in sequential order. Enter 2A through 2C.
3-80	* DESCRIPTION OF CHANGE	Enter here a brief description of the change request which will give the EPA reviewer an idea of the scope of the request (left justify). Include a general description of devices and calibrations changed, not just part numbers. (i.e., Ignition timing retarded from 6 to 4 degrees BTDC to improve NOx emissions).

Card/Records 3A to 3C (three cards maximum)

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1-2	Card Type/Record Sequence	Required entry of card types in sequential order. Enter 3A through 3C.
11-12 22-23 33-34 44-45	REASON	Enter the appropriate reason code(s) for making the change request. (See back of form for list of codes.) One or more

55-56 66-67 77-78		codes should be entered.

Column Number	Field Title	Instructions
NOTE: At least one reason code must be given on each change request form.		
	Card/Records 4A -40 (15 cards maximum)	
1-2	Card Type/Record Sequence	Required entry of card types in sequential order. Enter 4A through 40 (alpha "Oh").
3 & 33	CODE TYPE	Enter a "N" if the following two fields are engine codes, a "V" if the following two fields are EVAP codes.
4-17 & 34-47	* OLD ENGINE or * OLD EVAP CODE (before change)	Enter the old (existing) engine and/or evap or codes affected by this change request. The engine or evap codes entered indicates those codes within the engine family/ evap family combination (on card/record 1R) to be included in this change request. The codes must be consistent with the codes found in the Application Format and Vehicle Information (VI) prior to this change request (left justify). Note: Evap codes cannot exceed 8 columns in length. If the word "ALL" is entered, left justified for this field, then all engine or evap codes within this vehicle class, engine family/evap family combination will be included in this change request. Fill out card A fully before

proceeding to card B.
Similarly for cards C through 0.

Column Number	Field Title	Instructions
18-31 & 48-61	* NEW ENGINE or * NEW EVAP CODE (if any)	If any engine and/or evap codes are to be revised by this change request, enter the new codes which will take effect upon approval of this change request. The revised code replaces the old codes in the field immediately preceding this field. If the code is not to be revised, leave this field blank (left justify). "All" is not a valid entry for this field. Fill out card A fully before proceeding to B. Similarly for cards C through O.
63-67 & 71-75	CAR LINE CODE	Only if the change type "Additional Model" is checked on card type 1R, enter the appropriate car line codes for all additional models. This car line code must be consistent with the car line codes assigned to that model by EPA.
69 & 77	SALES LOC (Sales location)	Enter the appropriate sales location code for the model addition noted under car line code. (see back of form)
	Card/Records 5A to 5F (six cards maximum)	
1-2	Card Type/Record Sequence	Required entry of card types in sequential order. Enter 5A through 5F.
3 & 30	TEST PERF. (Testing Performed Code)	Enter the appropriate code, found in the back of the form, which best describes the

		testing performed to qualify this running change. This code pertains to the test vehicle ID field which follows. Note: Generally, at least one before configuration and one after configuration code will be entered here.

Column Number	Field Title	Instructions
10-25 & 37-52	* TEST VEHICLE ID	Enter the exact vehicle identification number as it appears in the Vehicle Information (VI) data base. EPA will determine the tests supporting this change request from this vehicle ID and the following version number.
26-27 & 53-54	* VI VERSION	For the test vehicle ID entered in the preceding field enter the proper version number to identify the vehicle version used to support this change request.
56-80	MFR REP (Manufacturers Representative)	Enter the last name of the person to contact for additional information regarding this change request.

Card/Record 6A to 6F (six card maximum)

1-2	Card Type/Record Sequence	Required entry of card types in sequential order. Enter 6A through 6F.
3-28 & 30-55	* MULTIPLE COMBINATIONS	When this change request applies to several engine family/ evap family combination but not all combinations within a given vehicle class from card/record

1R, additional engine family/ evap family combinations may be entered here.

The first engine family/evap family combination must be entered on card/record 1R. All additional combinations can be entered here. The code "All" cannot be used on card/record 1R or here on card type 6. However, "All" is still appropriate for engine/evap codes on card type 4.

Column Number	Field Title	Instructions
		Fill out card A fully before preceding to card B. Similarly for card C through F (left justify).
-97-	Car/Truck Line	

VII. THE CAR/TRUCK LINE INFORMATION SHEET

A. Procedure

The Car/Truck Line Information Sheet is EPA's mechanism for entering car/truck line codes with interior volume data and class codes for models being covered by the certification and fuel economy process. These car/truck line codes are used on the Vehicle Information Data Sheet (VIDS), the Summary Sheet Form, (Card 5's) and the General Label and Manufacturers Average Fuel Economy input forms (Card 5's). The Car/Truck Line code consists of five digits and must be available in the car/truck line data base prior to submission of the interior volume data. If car line manufacturer and car line codes have been entered for a previous year, there is no need to enter these

again. All of the codes existing for a year are carried over to the next year without the interior volume information. The interior volume information must be submitted for the new year. Only those codes which are not to be used should be deleted. The following instructions define each field.

B. Field-by-Field Instructions

A. Manufacturer Entry Format

Column Number	Field Title	Instructions
1	PROC (Process code)	Enter "A" if adding a manufacturer record, "C" if changing/correcting an existing record, "D" if deleting a record.
2	[Card Number]	Leave value if these data are submitted on the hard-copy input sheet. Enter '1' if these data are submitted in machine readable form.
4-5	MODEL YEAR	Enter last 2 digits of model year.
6-8	CAR LINE MANUFACTURER	This number is the first 3 digits of the car line code. It is not the manufacturer code used on the EPA VI sheets. There are separate codes for

Column Number	Field Title	Instructions
		each division and for cars and trucks. Codes 001 through 499 for cars, codes 500 through 999 for trucks.
15-46	FULL MANUFACTURER NAME	Enter the manufacturer name as it will appear in the Guide.

48-68	ABBREVIATED MANUFACTURER NAME	Enter a 21 character version of the manufacturers name. If left blank, the full manufacturer name is transferred to the this field and truncated if too long.

B. Car Line Name Entry Format

l	PROC (Process code)	Choose from below: A = Add new mfr. record C = Change existing record D = Delete existing record
2	[Card Number]	Leave value if these data are submitted on the hard-copy input sheet. Enter '1' if these data are submitted in machine readable form.
4-5	MODEL YEAR	Enter two digit model year this car line will represent.
6-10	CAR LINE CODE	Enter 5-digit car line code number.
12-13	CLASS CODE	Enter the appropriate code for the car line from the list below. 01 Two Seaters 02 Minicompact Cars 03 Subcompact Cars 04 Compact Cars 05 Midsize Cars 06 Large Cars 07 Small Station Wagons 08 Midsize Station Wagons

Column Number	Field Title	Instructions
		09 Large Station Trucks 10 Small Pickup Trucks 2WD 11 Small Pickup Trucks 4WD 12 Standard Pickup Trucks 2WD 13 Standard Pickup Trucks 4WD

		14 Vans, Cargo Vans 15 Vans, Passenger Vans 16 (Reserved) 17 Special Purpose Vehicle 2WD 18 Special Purpose Vehicle 4WD 19 Special Purpose Vehicle Cab Chassis
15-46	FULL CAR LINE NAME	Enter full car line name as it will appear in the Guide.
48-68	ABBREVIATED CAR LINE NAME	Enter a shorter version of the car line name. If left blank, the Full Car Line Name will be transferred to the abbreviated.
70	FOOTNOTE	If this car line is to be sold only in Puerto Rico, place an asterisk in this column.

C. Car Line Interior Volumes Entry Format

l-2	[Process code and card number]	Do not change value if these data are submitted on the hard-copy input sheet. Enter 'C2' if these data are submitted in machine readable form.
4-5	MODEL YEAR	Enter model year using the last 2 digits.
6-10	CAR LINE CODE	Enter 5 digit car line code.
12-18	AVERAGE PASSENGER VOLUME	Enter the average passenger volume for all body styles in that car line.
20-25	AVERAGE LUGGAGE VOLUME	Enter the average luggage volume for all body styles in that car line.

Column Number	Field Title	Instructions
27-29	AVERAGE TWO-DOOR PASSENGER VOLUME	Enter the average passenger volume for all two-door body

		styles (except hatchbacks) in that car line, rounded to a whole number.
31-32	AVERAGE TWO-DOOR LUGGAGE VOLUME	Enter the average luggage volume for all two-door body styles (except hatchbacks) in that car line, rounded to a whole number.
34-36	FOUR DOOR PASSENGER VOLUME	Enter the average passenger volume for all four-door body styles (except hatchbacks) in that car line, rounded to a whole number.
38-39	FOUR-DOOR LUGGAGE VOLUME	Enter the average luggage volume for all four-door body styles (except hatchbacks) in that car line, rounded to a whole number.
41-43	HATCHBACK PASSENGER VOLUME	Enter the average passenger volume for all hatchback body styles (regardless of the number of doors) in that car line, rounded to a whole number.
45-46	HATCHBACK LUGGAGE VOLUME	Enter the average luggage volume for all hatchback body styles (regardless of the number of doors) in that car line, rounded to a whole number.
48-49	CLASS CODE	Enter class code.

VIII. THE SPECIAL DF/CSPM IDENTIFIER DATA SHEET

A. Procedure

The Special DF/CSPM Identifier Data Sheet is EPA's mechanism for entering specially calculated deterioration factors or Cold Start Program Modifier trip points.

The submission of deterioration factors to be entered into the EPA

data base are of two types. The first type is a deterioration factor which is calculated by some method other than described in 40 CFR 86.082-28(a)(4)(B). The second type is for the deterioration factor to be supplied by the manufacturer for the 1984 trucks as described in 40 CFR 86.084-28(b)(4)(ii). There are three options available for the 1984 trucks. They are: Option 1 for Average Useful-Life, Option 2 for Assigned Useful-Life, and Option 3 for Half-Life, Useful-Life. For options 1 and 2, the d.f.'s should be supplied on this form with the appropriate fields completed. Option 3 is defined as Half-life Useful-Life which is 50,000 miles and the deterioration factors should be processed the same way as the 1983 model year. If option 3 is chosen to be submitted on this form, the deterioration factor is expected to be a specially calculated deterioration factor determined by some other method than described in 40 CFR 86.084-28(a)(4)(B). For option 3, entry of the Idle CO deterioration factor should be on Card 2 of the Summary Sheet Form (SSF).

The Cold Start Program Modifier (CSPM) submission will enter the system miles trip point for a durability vehicle. The trip point is used by the deterioration factor system to identify and calculate the deterioration factor with a one-step function.

Deterioration factors which are calculated by some method other than defined in 40 CFR Part 86 must be approved in advance by the Certification team. This form should then be submitted to the team.

B. Field-by-Field Instructions

Card 1

Column Number	Field Title	Instructions
l-3	MFR (Manufacturer Code)	Enter the three digit manufacturer code listed on the back of the Vehicle Information Data Sheet. If this field is blank or erroneous, the processing will be terminated.

Column Number	Field Title	Instructions
5-20	DURA VID (Durability Vehicle Identification)	Enter the exact vehicle indentification number as already entered into the EPA Vehicle Information data base. If this

		field is blank or contains a non-locatable Vehicle ID, processing will be terminated.
22-23	YR (Year)	Enter the last 2 digits of the certifying model year. If this field is left blank or the value is less than 82, processing will be terminated.
25-29	CSPM TRIP PT (Cold Start Program Modifier Trip Point)	Enter the system miles point the electronic device installed is expected to trip. This value is used in calculation of the d.f. with a one step modifier. If this field is used, all other cards and fields pertaining to d.f. data should not be used. If the value entered is less than the 10K test point and greater than the 40K test point, no entry of the CSPM will be allowed.
32-37	USEFUL LIFE MILES	If this data sheet is used to identify the d.f's for a 1984 truck and options '1', '2', or '3' is used, this field must have values greater than or equal to 50,000 miles. If this field is left blank and the options of 1 or 2 are used for a truck, processing will be discontinued.
38-39	DF CODE	For the 1984 LDT and LDDT, enter the option used for durability useful miles. The options available are: 01 Average useful-life 02 Assigned useful-life 03 Half-life useful-life

An invalid value will cause processing to be terminated. If left blank, the default value is '03'.

40-79	COMMENTS	Enter any comments about this d.f., how derived at, etc.
80	[Card Number]	Leave blank if these data are submitted on a hardcopy Special DF/CSPM Identifier Sheet. Enter "1" if these data are submitted in machine readable form.

Card 2, 3, 4

Column Number	Field Title	Instructions
1-11	HC 4K (Card 2) 00 4K (Card 3) NOx 4K (Card 4)	If this form is used for d.f. entry, enter the interpolated 4,000-mile point if known, otherwise leave blank.
12-22	HC 50K (Card 2) CO 50K (Card 3) NOx 50K (Card 4)	Enter the interpolated 50,000-mile point if known, otherwise leave blank. If option 1 and 2 are used for trucks, this field will be identified as "Useful Life miles."
23-28	HC DF (Card 2) CO DF (Card 3) NOx DF (Card 4)	Enter the d.f.'s for HC on Card 2, CO on Card 3 and NOx on Card 4.
32-79	Comments (Card 2 only)	Enter additional comments about d.f.
80	[Card Number] (Cards 2, 3,4)	Leave blank if these data are submitted on a hard-copy Special D.F./CSPM Identifier sheet. Enter "2" or "3" or "4" for appropriate card if these data are submitted in machine readable form.

Card 5

Column Number	Field Title	Instructions
1-11	Evap/Diesel Particulates 4K	If gasoline, enter the Evap interpolated 4,000-mile point. If diesel, enter the Diesel Particulate interpolated 4,000-mile point. If not known, leave this field blank.
12-22	Evap/Diesel Particulates 50K	If gasoline, enter the Evap interpolated 50,000-mile point. If diesel, enter the Diesel Particulate interpolated 50,000-mile point. If not known, leave this field blank.
23-38	Evap/Diesel Particulates DF	Enter the d.f. for Evap, if gasoline or Diesel Particulates, if diesel.
80 -	[Card Number]	Leave blank if these data are submittted on a hard-copy Special D.F./CSPM Identifier Sheet. Enter "5" if these data are submitted in machine readable form.

Card 6

l-11	Idle CO 4K	For 1984 truck (gasoline only), enter the Idle CO interpolated 4,000-mile point. If not known, leave this field blank.
12-22	Idle CO 50 K	For 1984 truck (gasoline only), enter the Idle CO interpolated 50,000-mile point. If not known, leave this field blank.
23-28	Idle CO DF	For 1984 truck (gasoline only), enter the Idle CO d.f.

Summary of Changes to the 1984 Model Year Data Supplement

Page of 84 MY Data Supplement Reflecting Change	Description of Change	Reason for Change
2	Add paragraph I.A.5 to cover the Certification Change Request Form.	Include CCRF in Data Supplement.
2	Add paragraph I.A.6 to cover the Car/Truck Line Information System data sheet.	Include the Car/Truck Line Information System in Data Supplement.
2	Add paragraph I.A.7 to cover the Special DF/CSPM Identifier data sheet.	Include the Special DF/ CSPM Identifier in Data Supplement.
4	Add Idle CO standards.	Reflect regulation changes.
5, 6, 7	Change standards for high-altitude LDV and low-and high-altitude standards for LDT. Add Idle CO standards.	Reflect regulation changes.
7,8	Revise paragraphs I.F.l.a, b, c & d on data submittal timing.	Reflect regulation changes.
19,20	Revise paragraph III.C.l.a for data submittal.	Reflect regulation changes.
25	Revise paragraph III.C.5.d to change information re-quirements.	Reflect regulation changes.
25	Add paragraph III.C.5.e to explain new situation for testing of carried over configurations.	Clarify data entry procedures.
37	Relocation of Trans. Config. field on Vehicle Information Data Sheet from Card 3 to Card 5.	Expansion of field size from 1 digit to 2 digits and addition of codes.

Page of 84 MY Data Supplement Reflecting Change	Description of Change	Reason for Change
38	Add paragraph under Control Systems for Diesels and use of code '02' (Engine Mod).	Policy changes.
41	Revise shift speed codes on Vehicle Information Data Sheet on Card 3.	For collection of up-to-date information.
43	Add code to "TIM-GEAR" field.	Identify new code in Data Supplement.
47-48	Revise assigned deterioration factors.	Reflect regulation changes.
48	Add description of Odometer Correction field in VIDS, Card 5, cols. 42-52.	Describe new field.
49	Relocation of Transmission Configuration field to VIDS, Card 5.	Expand codes to 2 digits.
49	Add new field, Transmission Modifier, to VIDS, Card 5.	Include Transmission Modifier field in Data Supplement.
50	Add new field, SIL, to VIDS, Card 5.	Include Shift Indicator Light field in Data Supplement.
52	Revise paragraphs IV.A on data submittal.	Reflect regulation changes.
53	Revise paragraph IV.A.2 on test result reporting.	Reflect regulation changes.
54	Revise paragraph IV.C to add Idle CO test procedure 10.	Reflect regulation changes.
56	Revise paragraph IV.D on test disposition assigned for FEDV's.	Correction and clarification.
57	Revise description of Test Procedure field to include Idle CO test on MTDS.	Reflect regulation changes.

59	Revise description on Cert. Disp. Code.	Clarification.

Page of 84 MY Data Supplement Reflecting Change	Description of Change	Reason for Change
62	Add description of Average Code field in MTDS, Card B col. 39.	Describe new field.
62	Add description of Test Lab Code field in MTDS, Card B, cols. 40-42.	Describe new field.
62	Add new field, Idle CO, %, to MTDS, Card B,cols 43-47.	Reflect regulation changes.
65	Add paragraph describing use of the Outlier Procedure for deterioration factor calculations.	Reflect regulation changes.
69	Revise paragraph V.B.3 on on test result inclusion in Summary Sheet.	Reflect regulation changes.
70	Add new field, System Number, to SSF, Card 1, col. 24.	Include System Number field in Data Supplement.
70	Remove fields, Mfr. Name, Cert Type, and Certificate Number from SSF, Card 1.	Include change in Data Supplement.
71	Add new field, Altitude, to SSF, Card 1, col. 79.	Include Altitude field in Data Supplement.
72	Add 1984 LDT deterioration factor procedures in SSF.	Reflect regulation changes.
74,75	Revise assigned deterioration factors.	Reflect regulation changes.
75,76	Revise Deterioration Factor Type code descriptions to include light-duty trucks deterioration factor identification.	Reflect regulation changes.

78	Add new field, Idle CO Deter- ioration Factor, to SSF, Card 2.	Reflect regulation changes.
79,80	Revise Emission Type code explanations to include a new code for Idle CO.	Reflect regulation changes.

Page of 84 MY Data Supplement Reflecting Change	Description of Change	Reason for Change
80	Revise explanation of Test Number field.	Include changes in Data Supplement.
81	Revise explanation of Exhaust DFC field to include Idle CO.	Reflect regulation changes.
87-96	Add Section VI explaining the preparation of the Certification Change Request Form.	Include discussion of the Certification Change Request Form in the Data Supplement.
97-100	Add Section VII explaining the preparation of the Car/ Truck Line Information Sheet.	Include discussion of the Car/Truck Line Informa- tion Sheet in the Data Supplement.
101-104	Add Section VIII explaining the preparation of the Special DF/ CSPM Identifier Data Sheet.	Include discussion of the Special DF/CSPM Indenti- fier Data Sheet in the Data Supplement.
Attachment 24	Add the Appendix for EPA Standardized Engine Family Names from the Application Format.	Include the Appendix in the Data Supplement with updated codes.

ATTACHMENT 1

CSC -EPA MVEE/COMPUTER OPERATIONS

** MANUFACTURER JOB REQUEST **

MANUFACTURER'S REPRESENTATIVE

MANUFACTURER NAME

REPRESENTATIVE NAME

TYPE OF INPUT

1. ENGINE-SYSTEM INFORMATION (1005) JOB#

2. VEHICLE INFORMATION DATA (1000) JOB# _

3 . MFR TEST DATA (1 202) JOB#

4. L.D. VEHICLE SUMMARY (1245) JOB#

5. RUNNING CHANGES (1216) JOB# _

6. CAR/TRUCK LINE INFORMATION SHEET JOB#
(1263)

7. SPECIAL DF/CSPM IDENTIFIER (1020) JOB# _

OPERATIONS

COMPLETED DATE/TIME _ INIT.

COMMENTS

-

DISTRIBUTION: 1 OPERATIONS, 1 CERTIFICATION, 1 MFR REP

CSC EPA FORM #006 5/31/79
REVISED 7/21/81

Attachments 2 through 7 are stored as CD8302_2.PCX through CD830212.PCX

Attachment 8

Three-Star Data Entry Errors For Vehicle Information Data Sheets

Commission of a three-star error terminates processing of a VI Data Sheet; no entry will be made to the Vehicle Information file, no Vehicle Specification Report will be printed, and the only output generated will be a short error message. Three-star errors are of two types: (1) data entry errors made on the VI sheet itself and (2) input to the VI data fields that contradicts information previously entered in the Engine System Information (ESI) file describing the engine-system combination to which the test vehicle belongs.

A. Critical Data Entry Errors for Vehicle Information Sheets.

These errors are fully described by the messages that are printed out when these errors are detected. These messages are:

*** ERROR: VEHICLE ID IS NOT LEFT-JUSTIFIED. MFR= <manufacturer code> VEHID= <vehicle id> DATA ENTRY ERROR.

*** ERROR: CHANGE/CARRYOVER/MOD REQUESTED WITHOUT SPECIFYING EXACT VERSION. MFR= <manufacturer code> VEHID= <vehicle id>

Since the program cannot determine which VI record should be the basis for the change/carryover/correction, processing must stop.

*** ERROR: CANNOT ENTER MODEL YR FOR CHANGE OR CARRYOVER MFR= <manufacturer code> VEHID= <vehicle id>

The model year must be the same for all vehicle versions.

*** ERROR: CANNOT "BLANK OUT" MODEL YEAR OR ACTIVE YEAR MFR= <manufacturer code> VEHID= <vehicle id>

*** ERROR: NO SUCH MANUFACTURER. MFR= <manufacturer code> vehid= <vehicle id> VERSION= <vehicle version>

Attachment 8

The program cannot recognize the manufacturer code entered in card 1, columns 1-3.

*** ERROR: CHANGE, CORR OR C/O ATTEMPTED, BUT VEH NOT IN V.I. MASTER FILE. MFR= <manufacturer code> VEHID= <vehicle id> VERSION= <vehicle version>

The program cannot find the record on which to base the change/carryover/correction.

*** ERROR: DISALLOWED NEW ENTRY: MFR= <manufacturer code> VEHID= <vehicle id> ALREADY EXISTS IN VEH. MASTER/LOCATOR FILE.

An erroneous attempt has been made to enter a "new" submission when data on the vehicle already exists in the VI file. Either a duplicate submission or an error in the vehicle id specification has occurred.

*** ERROR: CANNOT FIND VERSION <vehicle version> for MFR= <manufacturer code> VEHID <vehicle id>

Failure to specify version number makes it impossible to identify the record needing modification or updating.

*** ERROR: MODEL YEAR CANNOT BE CORRECTED. MORE THAN 1 VERSION EXISTS. MFR= <manufacturer code> VEHID= <vehicle id>

*** ERROR: CANNOT CORRECT MODEL YEAR, INERTIA CLASS, OR ACTUAL DYNO HORSEPOWER FOR MFR= <manufacturer code> VEHID= <vehicle id> BECAUSE TEST <test number> (AND MAYBE MORE) WOULD BE INCORRECT.

The model year, inertia class, and actual dynamometer horsepower fields cannot be modified once tests on the vehicle have been run.

*** ERROR: CANNOT CORRECT ACTIVE YEAR. MFR= <manufacturer code> VEHID= <vehicle id> VERSION= <vehicle version>

**$ ERROR: VEHICLE VERSION ALREADY CARRIED OVER TO VERSION <vehicle version> MFR= <manufacturer code> VEHID= <vehicle id>

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A particular vehicle version can serve only once as a basis for carryover. Carryover will have to be based on a version other than the one indicated by the erroneous submission.

*** ERROR: CANNOT CARRYOVER WITHOUT ACTIVE YEAR ENTRY. MFR= <manufacturer code> VEHID= <vehicle id> VERSION= <vehicle version>

*** ERROR: ACTIVE YEAR CANNOT BE CHANGED. SHOULD CARRY OVER. MFR= <manufacturer code> VEHID= <vehicle id>

Entry of the active year field (card2, columns 72-73) is required for carryover submissions.

*** ERROR: ACTIVE YEAR SPECIFIED FOR CARRYOVER ALREADY OCCURS IN THE C/O CHAIN AT VERSION <vehicle version> MFR= <manufacturer code> VEHID= <vehicle id>

A carryover submission cannot be processed without specifying an active year not present on any versions of the vehicle currently present in the VI file. ACTIVE YEAR CANNOT BE CHANGED. SHOULD CARRYOVER. MFR= <manufacturer code> VEHID= <vehicle id>

Modifications to the active year field can be accomplished only by "carryover" submissions, not by either "change" or "correction" submissions.

*** ERROR: CANNOT MAKE CHANGES TO DURABILITY VEHICLE: MFR <manufacturer code> VEHID= <vehicle id>

*** ERROR: READ ERROR IN REPL. CARD 1. NOT PROCESSED. DO NOT USE *'S IN NUMERIC FIELDS. DATA ENTRY ERROR.

*** ERROR: LOOKING FOR CARD 1, FOUND CARD TYPE <card type code>
DATA ENTRY ERROR.

*** ERROR: CANNOT MAKE A NON-DURABILITY VEHICLE INTO A DURABILITY
VEHICLE: MFR= <manufacturer code> VEHID= <vehicle id>

*** ERROR: CANNOT CHANGE VEHICLE MODEL FROM VEHICLE TO TRUCK DURING
CARRY OVER OR CORRECTION.

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*** ERROR: CANNOT CHANGE VEHICLE MODEL FROM TRUCK TO VEHICLE DURING
CARRY OVER OR CORRECTION.

*** ERROR: INVALID MODEL YEAR: <model year>

*** ERROR: BLANK VEHICLE TYPE

*** ERROR: VEHICLE TYPE <vehicle type code> FOR MODEL YEAR
<model year>

*** ERROR: DUPLICATE CARD OR CARD OUT OF SEQUENCE:
<.........DUPLICATE CARD PRINTED .....> DATA ENTRY
ERROR

*** ERROR: *** ILLEGAL CARD TYPE IN REPLACEMENT RECORD.IGNORED:
<.........ILLEGAL CARD PRINTED ....>

*** ERROR: CANNOT CORRECT THIS VERSION FROM A CERT VEHICLE TYPE TO
A NON-CERT AS TESTS HAVE ALREADY RUN. MFR=
<manufacturer code> VEHID= <vehicle id>

*** ERROR: CANNOT MAKE CHANGES TO DURABILITY VEHICLE: MFR
<manufacturer code> VEHID= <vehicle id>

---WARNING:
BAD RETURN CODE OF "<return code value>" FROM VI REPORT

SUBROUTINE -VI ENTERED, ASSIGNED CRITICAL CODE "3"

*** ERROR: CANNOT CARRY OVER OR CHANGE A VEHICLE VERSION THAT CONTAINS AN ERROR.

*** ERROR: CANNOT CARRY OVER OR CHANGE IF THE LAST VERSION CONTAINS AN ERROR.

B. Critical Discrepancies between ESI Records and VI Submissions.

A three-star error can result from a discrepancy between information previously entered in the ESI file and information entered on a VI Sheet newly submitted for processing. For example, if the ESI file indicates that an engine-system combination is equipped with a three-way catalyst, then a VI submission for any vehicle belonging to that combination must similarly indicate the presence of a three-way catalyst, or a three-star error hill occur. Messages which

Attachment 8

signal such discrepancies between engine-system and vehicle information are as follows:

*** ERROR: COULD NOT LOCATE OR MATCH UP ENGINE FAMILY <"engine family name> for MFR= <manufacturer code> VEHID= <vehicle id> RETURN= <return code>

The new VI submission contains information inconsistent with the information previously entered into the ESI file, so the VI submission will not be processed. The nature of the inconsistency is indicated by the following return code values:

RETURN = 1 -Engine family name does not match any entry in the ESI file.

RETURN = 2 -Displacement does not match the corresponding entry in the ESI file.

RETURN = 8 -Control systems are not compatible with the corresponding entry in the ESI file

*** ERROR: COULD NOT LOCATE ENGINE FAMILY "<engine family name>" FOR MFR= <manufacturer code> VEHID= <vehicle id> SYSNO= <system number>

This message is printed for carryover, correction, and change submissions only.

*** ERROR: COULD NOT MATCH UP CHANGED FIELDS FOR ENGINE FAMILY <engine family name> MFR= <manufacturer code> VEHID= <vehicle id> SYSNO= <system number> ACTIVE YEAR= <active year>

This message is printed for carryover, correction, and change submissions only.

*** ERROR: CANNOT CARRYOVER WITHOUT AN ENGINE FAMILY ENTRY. MFR= <manufacturer code> VEHID= <vehicle id>

*** ERROR: *** COULD NOT LOCATE ENGINE SYSTEM FOR ENGINE FAMILY= <engine family name> MFR= <manufacturer code> VEHID= <vehicle id> SYSNO= <system number>

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*** ERROR: INVALID CONTROL SYSTEM FOR ENGINE FAMILY= <engine family name> MFR= <manufacturer code> VEHID= <vehicle id> SYSNO= <system number>

*** ERROR: ACTIVE YEAR DOES NOT MATCH ENGINE FAMILY YEAR FOR ENGINE FAMILY <engine family name> MFR= <manufacturer code> VEHID= <vehicle id> SYSNO= <system number> ACTIVE YEAR= <active year value>

*** ERROR: FUEL INJECTION INDICATORS DID NOT MATCH UP FOR FAMILY <engine family> MFR= <manufacturer code> VEHID= <vehicle id> SYSNO= <system number>

*** ERROR: COULD NOT DELETE THIS VEHICLE FROM THE RECORD FOR ENGINE FAMILY <engine family name> MFR= <manufacturer code> VEHID= <vehicle id> SYSNO= <system number> VEHICLE ASSIGNED CRITICAL CODE OF "3"

*** ERROR: (NEW OR CARRY OVER) VEHICLE ALREADY EXISTS IN ENGINE FAMILY FILE (1000D-ENFAM) OR THE ENGINE FAMILY NAME IS INVALID FOR ENGINE FAMILY = "<engine family name>" MANUFACTURER= <manufacturer code> VEHID= <vehicle id> SYSNO= <system number> VEHICLE ASSIGNED CRITICAL CODE OF " 3 "

*** ERROR: FOR MFR <manufacturer code> VEHICLE <vehicle id> VERSIN <vehicle version> ENGINE FAMILY <engine family name> CRITICAL CODE 3 ASSIGNED DUE TO ERROR WITH ADD/DELETE TO ENGINE FAMILY/VI(ENFAM) LOCATOR FILE.

Attachment 4A contains a table of code equivalencies which indicates which VI Control System codes are required by various entries to the ESI's Exhaust Emission Related Components field.

C. The Vehicle Information program duplicates several error checks that are ordinarily performed by the preprocessor. These error checks generate messages which should only be written if preprocessor software is changed in the future or if preprocessor software fails to run correctly. Messages produced by these error checks are described below.

*** ERROR: ILLEGAL PROC CODE: MUST BE BLANK/M/R/C. MFR <manufacturer code> VEHID = <vehicle id> DATA ENTRY ERROR.

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D. Several fatal errors can occur because of problems in software or data that must be corrected by EPA. Some of these errors are diagnosed by the Vehicle Information Program and generate the messages described below. Users should notify EPA if any of these messages are printed.

*** ERROR: VI MASTER/LOCATOR -VEHICLE COUNT ERROR

*** ERROR: V.I MASTER EMPTY

*** ERROR: V.I. MASTER FIRST RECORD OUT OF PLACE

*** ERROR: READ ERROR IN VEH. INFO MASTER FILE LINE <line number>
DATA ERROR

*** SOFTWARE ERROR
ACCESSING VEHICLE LOCATOR FILE RETURN CODE FROM
SUBROUTINE VIENTR = <return code value> GET HELP

*** SOFTWARE ERROR:
VEHICLE MAY BE CARRIED OVER BUT NOT DF. SEE HEAD OF
COMPUTER OPERATIONS. RETURN CODE FROM NVIRPT CALL =
<return code value>

**** DEADLOCK
ON SECOND TRY. RELEASING LOCK STATUS INFORMATION. FIND
FROM LOCKING ACCOUNT WHICH PROGRAM IS BEING RUN. REPORT
TO HEAD OF COMPUTER OPERATIONS.

Attachments 9 through 20 are stored as
CD830213.PCX through CD830239.PCX

TRANSACTION TYPE SHOULD BE C, A, OR D

CARD NUMBER SHOULD BE BLANK, 1, OR 2

DELETE TRANSACTION HAS DATA IN CARD

ONLY CARLINE NAMES IN MFR RECORD MAY BE ADDED OR CHANGED

FIRST 2 POSITIONS OF LINE NUMBER SHOULD BE MODEL YEAR

<.....CARD.....>
ERROR IN READING TRANSACTION FIELDS -PROBABLY ALPHABETIC DATA
IN NUMERIC FIELDS

TRANSACTION SHOULD NOT BE FOR CLASS RECORD

The above error messages indicate that errors existed in the input data. They should be corrected and resubmitted.

RECORD TO BE ADDED ALREADY EXISTS IN MASTER FILE

MFR DIVISION ALREADY EXISTS

THE CARLINE MFR/DIV RECORD CANNOT BE DELETED WHILE CARLINE RECORDS EXIST FOR THIS CARLINE MFR/DIV RECORD

NO MFR DIVISION CARLINE EXISTS FOR THIS CARLINE

The above error messages refer to manufacturer/division carline code additions/deletions.

WARNING: FULL NAME TRUNCATED AND COPIED TO ABBREVIATED NAME

If the abbreviated name field was blank in the input, the full name is transferred to the abbreviated name.

ABBREVIATED CARLINE NAME MUST EXIST FOR THE INTERIOR VOLUMES TO BE PROCESSED

This error will only occur for manufacturer/division records and carline records processed prior to 1983 with the abbreviated name field blank.

B. The following warnings deal with inconsistencies with the interior volumes. These are not critical errors and the data will be processed.

@ @ WARNING: CLASS CODE OUT OF 0-19 RANGE

@ @ WARNING: CARLINE CODE CONFLICTS WITH CLASS CODE

@ @ WARNING: MFR RECORD CONTAINS CAR-TRUCK RECORD DATA

@ @ WARNING: CLASS CODE DENOTES TWO SEATER OR LIGHT TRUCK
BUT VOLUMES ARE NOT BLANK

ATTACHMENT 21

DATA FILE ENTRY ERRORS FOR THE CAR TRUCK LINE FILE

A. Critical Data Entry Errors for Car Truck Line File:

.....Card # 1.....>
ILLEGAL CHARACTERS IN FIRST CARD -PROCESSING STOPPED

MODEL YEAR IS ILLEGAL -PROCESSING STOPPED

PRINT OPTION IS INVALID; NO MASTER FILE PRINTING WILL BE DONE

PRINT/CHECK OPTION IS INVALID; PRINTING AND CHECKING OF THE ENTIRE MASTER FILE WILL NOT BE DONE

The above messages refer to the first card. The illegal characters are probably alphabetic in a numeric field or are not within the range for that field.

INCORRECT LINE NUMBER AT THE END OF THIS RECORD -PLEASE NOTIFY A CERT. PROGRAMMER

** ILLEGAL CHARACTER IN DATA BASE AT LINE <line no>

ERROR IN READING MASTER FILE RECORD FIELDS -CHECK ACRTRK PROGRAM CODE <.....Card.....>

The above error messages refer to possible errors in the data base.

LINE NUMBER <line no> ALREADY EXISTS FOR <Mfr name>

RECORD TO BE DELETED OR CHANGED DOES NOT EXIST IN THE MASTER FILE

The above error message refer to a possible conflict between the input and the Data Base.

ERROR IN READING CARD 2 VOLUME FIELDS -PROBABLY ALPHABETIC DATA IN NUMERIC FIELD

ADD OR CHANGE TRANSACTION HAS NO DATA IN CARD

ADD TRANSACTION REQUIRES FULL CARLINE NAME

CAR LINE CODE CONFLICTS WITH CLASS CODE

ATTACHMENT 21

@ @ WARNING: CLASS CODE INCONSISTENT WITH SUM OF AVERAGE PASSENGER AND LUGGAGE VOLUMES

@ @ WARNING: 2 DOOR PASSENGER VOLUME OUT OF 40-200 RANGE

@ @ WARNING: 2 DOOR LUGGAGE VOLUME CAN ONLY BE BLANK WHEN 2 DOOR PASSENGER VOLUME IS BLANK

@ @ WARNING: 2 DOOR LUGGAGE VOLUME OUT OF 0-60 RANGE

@ @ WARNING: 4 DOOR PASSENGER VOLUME OUT OF 40-200 RNAGE

@ @ WARNING: 4 DOOR LUGGAGE VOLUME CAN ONLY BE BLANK WHEN 4 DOOR PASSENGER VOLUME IS BLANK

@ @ WARNING: 4 DOOR LUGGAGE VOLUME OUT OF 0-60 RANGE

@ @ WARNING: H-BACK PASSENGER VOLUME OUT OF 40-200 RANGE

@ @ WARNING: H-BACK LUGGAGE VOLUME CAN ONLY BE BLANK WHEN H-BACK PASSENGER VOLUME IS BLANK

@ @ WARNING: H-BACK LUGGAGE VOLUME OUT OF 4-60 RANGE

Attachment 22 -stored as CD830240.PCX

I. CSPM IDENTIFIER ATTACHMENT 22-A

CARD 1 ONLY.

Col	Description
1-3	Manufacturer Code
5-20	Durability Vehicle ID
22-23	Active Year
25-29	CSPM Trip Point

NOTE: Remainder of card is ignored.

II. SPECIAL DF's

A. CARD 1

Col	Description
1-3	Manufacturer Code
5-20	Durability Vehicle ID
22-23	Active Year
32-37	Useful Life Mileage (TRUCKS ONLY)
38-39	Special DF Code (1 -Average Useful Life 2 -Assigned Useful Life 3 -Other
40-79	Comments (Optional)

B. CARD 2 -6

Col	Description
1-11	4K Emission Level
12-22	50K Emission Level
23-28	Special DF
32-79	Comments (CARD 2 ONLY -Optional)

NOTE: Particulate data must be included on Diesel engine types.

NOTE: Card 6, Idle CO Data, must be included on TRUCKS only.

ERROR MESSAGES FOR
CSPM/SPECIAL DF

1. The following are critical errors for CSPM/Special DF processing:

   The following errors result from errors in input data:

   * ERROR: COULD NOT FIND VI FOR MFR: <mfr code>
     VID: <Vehicle ID> YEAR: <Yr>
   * SKIPPING TO NEXT CARD 1

   * ERROR: CSPM RECORD ALREADY ON FILE FOR MFR: <Mfr>
     VID: <Vehicle ID> AT INDEX: <Index no>
     WITH TRIP POINT = <Trip Point>
   * SKIPPING TO NEXT CARD 1

   * ERROR: SPECIAL DF ALREADY ON FILE FOR MFR: <Mfr>
     VID: <Vehicle ID> AT INDEX <Index No>
   * SKIPPING TO NEXT CARD 1

   * ERROR: FOUND ANOTHER CARD 1 BEFORE COMPLETING THIS SPECIAL
       DF RUN
   * TERMINATING THIS REQUEST AND STARTING OVER WITH THE NEXT CARD 1

   * ERROR: HAVE ALREADY PROCESSED A CARD FOR <Mfr>
   * CARD IS: <.............Card.............>
   * SKIPPING TO NEXT CARD 1

   * ERROR: UNEXPECTED END-OF-FILE WHILE READING CARDS 2 THRU 6
   * PROGRAM TERMINATED

   * ERROR: USEFUL LIFE MILEAGE IS ONLY VALID FOR 1984 AND
     LATER MODEL YEARS
   * SKIPPING TO NEXT CARD 1

   * ERROR: USEFUL LIFE MILEAGE MUST BE PRESENT ONLY FOR 1984
     AND LATER LDT'S AND LDDT'S
   * SKIPPING TO NEXT CARD 1

   * ERROR: NO PARTICULATE DF ENTERED FOR DIESEL ENGINE
   * SKIPPING TO NEXT CARD 1

   * ERROR: 1984+ TRUCKS ONLY MUST HAVE IDLE CO DATA
   * SKIPPING TO NEXT CARD 1

   * ERROR: HC, CO, AND NOX DF'S MUST ALL BE PRESENT TO
       PROCESS SPECIAL DF'S
   * SKIPPING TO NEXT CARD 1

* ERROR: A SPECIAL DF CODE OF <DF Code> IS NOT VALID FOR
  MODEL YEARS LESS THAN 84
* SKIPPING TO NEXT CARD 1

* ERROR: A SPECIAL DF CODE OF <DF Code> IS VALID ONLY
  FOR TRUCKS
* SKIPPING TO NEXT CARD 1

The following two error messages result from errors in card numbering or from alphabetic data in a numeric field:

* ERROR: COULD NOT READ THIS CARD, OR CARD NUMBER NOT 2 THRU 6
* CARD IS: <.............Card
* SKIPPING TO THE NEXT CARD 1

* ERROR: CANNOT READ THIS CARD, OR NOT A CARD 1
* CARD IS: <.............Card
* SKIPPING TO NEXT CARD 1

The following error message results from an error in processing.

* ERROR: NO CARDS TO READ...

The following results from either an error in the input or a possible error exists in the Data Base.

* ERROR: COULD NOT FIND THE EMISSION STANDARD FORMATS FOR
  MFR: <mfr> VEHICLE ID: <Vehicle ID> AT INDEX: <Index no>
* SKIPPING TO THE NEXT CARD 1

2. The following are warnings and will permit faulty data to enter the Data Base and/or reports.

* WARNING: USEFUL LIFE MILEAGE SHOULD BE GREATER THAN
  50,000 MILES

* WARNING: COULD ONLY READ <num> OF THE <num> POINTS
  INDICATED AT INDEX <Index No>
* CONTINUING ON WITHOUT REPORTING MILEAGE POINT DATA

ATTACHMENT 23

Attachment 24

APPENDIX

EPA STANDARDIZED ENGINE FAMILY NAMES

EPA requests that manufacturers use a standardized system for identifying their individual engine families. The system suggested below has been developed by EPA after examining manufacturers' coding formats, discussing the concept with manufacturers, and observing the results of a pilot program initiated for the 1981 model year.

The pilot program has been successful; it resulted in an improved quality of data and reduced the time required for a given certification team to become familiar with multiple family identification methods.

One modification has been made to the naming systems to allow more flexibility to the manufacturers. The engine family name now consists of 12 characters with the use of the 10th and 11th left up to the manufacturer to make the names of the individual families unique. Some manufacturers indicated to EPA that this will allow them to develop a numeric code for diffentiating between the families.

Please use the following method for naming your engine families when submitting data either conventionally or electronically.
The standardized engine family name is formatted as follows:

first character	Model Year (see Table 1)
character 2 and 3	Letter code identifying manufacturer (see Table 2)
character 4, 5, and 6	Displacement in cubic inches (e.g., 350) or liters (e.g., 5.7). For dual displacement families enter the larger displacement. The decimal place is the equivalent of a digit.
character 7	Vehicle class (see Table 3)
character 8	Numeric code describing fuel metering system (see Table 4)
character 9	Letter code describing type of catalyst (see Table 5)
character 10 and 11	Alphabetic/numeric codes to make the first 9 digits unique.
character 12	Check-sum digit (CSD) -see the explanation below

Characters 10 and 11 are provided to ensure that the engine family name is unique. Any alphabetic character (except for I, O, Q, and U) or numeric character n through 9 can be used. Although these characters do not have any inherent meaning and may be selected randomly, a manufacturer is free to choose a combination of letters that can be readily associated with certain emission control technologies used in his product line.

For example, suppose that two engine families are identical except that one has regular air injection whereas the other has radial-air tubes (R.A.T. air). For the former case character 10 could be A and for the latter character 10 could be R. Consequently, it would be possible to associate the A with regular air injection and R with R.A.T. air.

As an additional example, a manufacturer may want to further describe his engine family by indicating the type of construction of his catalysts or combinations of catalyst construction available. This is where character 11 becomes useful to dramatically expand the possible meanings of each engine family name.

Examples

A 1980 GM family 01YZBA would be designated by the EPA standarized engine family format as:

A1G5.OV2ARSI

1) A indicates MY 1980 (Table 1)
2) 1G indicates that the engine is built by Chevrolet (Table 2)
3) 5.0 indicates displacement in liters
4) V indicates light-duty vehicle (gasoline) (Table 3)
5) 2 indicates a 2 barrel carburetor (Table 4)
6) A indicates an oxidation catalyst (Table 5)
7) R is hypothetically chosen
8) S is hypothetically chosen
9) 1 is the check sum digit

By the same method, a 1980 Ford family 5.8WAXC would be designated as such:

AFM5.8V2HBD4

1) A indicates MY 1980
2) FM indicates that the engine is built by Ford

3) 5.8 indicates displacement in liters
4) V indicates light-duty vehicle (gasoline)
5) 2 indicates a 2 barrel carburetor
6) H indicates three-way plus other catalyst and feedback control of fuel/air ratio
7) R is hypothetically chosen
8) D is hypothetically chosen
9) 4 is the check sum digit

Additionally, by example, a 1980 Mercedes-Benz family 80.22.35.30 would appear as follows:

AMB3.OD6JCF6

1) A indicates MY 1980
2) MB indicates the manufacturer as Mercedes-Benz
3) 3.0 indicates displacement in liters
4) D indicates light-duty diesel vehicle
5) 6 indicates mechanical fuel injection
6) J indicates noncatalyst is used
7) C is hypothetically chosen
8) F is hypothetically chosen
9) 6 is the check sum digit

Check-Sum Digit (CSD)

A check-sum digit is used in codes as a means of checking that the characters entered are correct. For example, in university courses, the registration code for Math 321 Section 4 might be 456-321-4-5 (Math). The 5 is tacked on the end so that the sum of all the digits is evenly divisible by some arbitrary number, in this case 10 (i.e., 4 + 5 + 6 + 3 + 2 + 1 + 4 + 5 = 30, which is divisible by 10). Thus a transcription error such as 466-321-4-5 would be flagged by a computer program.

Error checking with a CSD can be made more effective if different weights are applied to each digit before they are added together. For example, the value of the first digit can be multiplied by 9, the value of the second digit by 8, and so forth. This method will catch transposition errors that could be accepted by the previous method. In the example shown, if the number were entered as 456-312-4-5 (the 1 and 2 being switched), the computer would accept it since the sum is still equal to 30. The use of different weights on each digit would help prevent this type of error.

Method of Determining CDS

The following is the method for assigning the CSD for EPA standardized engine family names.

Step 1. Assign to each number in the ef code its actual mathematical value and assign to each letter the value specified below:

A = 1	J = 1	T = 3
B = 2	K = 2	V = 5
C = 3	L = 3	W = 6
D = 4	M = 4	X = 7
E = 5	N = 5	Y = 8
F = 6	P = 7	Z = 9
G = 7	R = 9	decimal pt. = 1
H = 8	S = 2	

Step 2. Multiply the assigned value for each character in the ef code by the weight factor specified for it below:

	Weight factor
1st	1
2nd	10
3rd	9
4th	8
5th	7
6th	6
7th	5
8th	4
9th	3
10th	2
11th	1

Step 3. Add the resulting products and divide the total by 11. The remainder is the CSD. If the remainder is 6, for example, the CSD is 6. If the remainder is 10, the CSD is X (Roman numeral 10).

Example 1: Determine the CSD if the first 11 characters are A1C5.0V2ARS (GM example).

	A	1	G	5	.	O	V	2	A	R	S
Assigned Value	1	1	7	5	1	0	5	2	1	9	2
Weighted Value	1	10	9	8	7	6	5	4	3	2	1
Products	1	10	63	40	7	0	25	8	3	18	2

Sum of Products = 177

Divide by 11 = 16 + 1/11
CSD = I

Therefore, the engine family name is A1G5.0V2ARS1.

Example 2: Determine the CSD or the ford example AFM5.8V2HBD.

	A	F	M	5	.	8	V	2	H	B	D
Assigned Value	1	6	4	5	1	8	5	2	8	2	4
Weighted Value	1	10	9	8	7	6	5	4	3	2	1
Products	1	60	36	40	7	48	25	8	24	4	4

Sum of Products = 257

Divide by 11 = 23 + 4/11
CSD = 4

Therefore, engine family name is AFM5.8V2MBD4.

Example 3: Determine the CSD for the Mercedes-Benz example AMB3.0D6JCF.

	A	M	B	3	.	O	D	6	J	C	F
Assigned Value	1	4	2	3	.	0	4	6	1	3	6
Weighted Value	1	10	9	8	7	6	5	4	3	2	1
Products	1	40	18	24	7	0	20	24	3	6	6

Sum of products = 149

Divide by 11 = 13 + 6/11
CSD = 6

Therefore, the engine family name is AMB3.0D6JCF6.

Attachment 24

APPENDIX

TABLE 1. SUBCODES FOR MODEL YEAR

Code	Year
A	1980
B	1981
C	1982
D	1983
E	1984
F	1985
G	1986
H	1987
J	1988
K	1989
L	1990
M	1991
N	1992
p	1993
R	1994
S	1995
T	1996
V	1997
W	1998
X	1999
Y	2000
1	2001
2	2002
3	2003
4	2004
5	2005
6	2006
7	2007
8	2008
9	2009
A	2010
B	2011
C	2012

Table 2. Subcodes for Manufacturers

MFR Code	Manufacturer	MFR Subcode
107	ACI	AC
092	ALBERT MARDIKIAN ENGINEERING	AE
090	ALFA ROMEO	AR
010	AMC	AM
070	ASTON MARTIN	AS
640	AUDI	AD
098	AURORA CARS	AA
100	AVANTI	AV
122	BITTER	BT
120	BMW	BM
130	BRISTOL	BR
040	BUICK (GMC)	4G
040	CADILLAC (GMC)	6G
140	CHECKER	CK
040	CHEVROLET (GMC)	1G
020	CHRYSLER	CR
150	CITROEN	CT
165	CUMBERFORD RESEARCH CORP	CM
195	DELOREAN	DL
216	EARNHART INC	EA
217	EUROWEST GRAND PRIX INC	EW
520	EXCALIBUR AUTOMOBILE	EX
220	FERRARI	FE
230	FIAT	FT
030	FORD	FM
660	FUJI HEAVY IND	FJ
040	GENERAL MOTORS	GC
246	GRUMMAN OLSON	GR
247	HESS & EISENHARDT	HE
260	HONDA	HN
265	HYUNDAI	HY
270	IHC	HC
290	ISUZU	SZ
305	JAGUAR ROVER TRIUMPH LIMITED	JR
690	LAMBORGHINI	LM
340	LANCIA	FL
345	LEGEND INDUSTRIES	LO
350	LOTUS	LT
360	MASERATI	MA
200	MERCEDES BENZ	MB
490	MITSUBISHI	MT
203	MUES IMPORT EXPORT	MS
380	NISSAN	NS

040	OLDSMOBILE (GMC)	3G
405	PANTHER	PA
410	PEUGEOT	PE
417	PINZGAUER OF AMERICA	PZ
040	PONTIAC (GMC)	2G
420	PORSCHE	PR
430	RENAULT	RE
435	REPLICAR	RC
440	ROLLS-ROYCE	RR
470	SAAB	SA
495	SATRA	SR
497	SHAY MOTORS CORP	SM
485	SHETLEY	SH
355	STEELBRO MANUFACTURING, LTD.	SB
625	SUPERIOR COACH	SC
540	SUZUKI	SK
560	TOYO KOGYO	TK
570	TOYOTA	TY
620	TVR	TV
577	USA PUMA MOTORS	PM
595	VILLAGE IMPORTS	VG
590	VOLKSWAGEN	VW
600	VOLVO	VV
617	ZIMMER	ZM

TABLE 3. SUBCODES FOR VEHICLE CLASS

Code	Vehicle Class
V	Light-Duty Vehicle (Gasoline)
T	Light-Duty Truck (Gasoline)
D	Light-Duty Diesel Vehicle
K	Light-Duty Diesel Truck

TABLE 4. SUBCODES FOR FUEL METERING SYSTEM

Code	Fuel Metering System
0	Multiple carburetors (e.g., four two-barrel)
1	1 BBL
2	2 BBL
3	3 BBL
4	4 BBL
5	Electronic fuel injection
6	Mechanical fuel injection
9	Other

TABLE 5. SUBCODES FOR CATALYST TYPES

Code	Catalyst Type
A	Single oxidation
B	More than one oxidation
C	Single reduction
D	More than one reduction
E	Three-way; no feedback control of fuel/air ratio
F	Three-way with feedback control of fuel/air ratio
G	Three-way plus other catalyst(s); no feedback control of fuel/air ratio
	Three-way plus other catalyst(s) and feedback control of fuel/air ratio
J	No catalyst
K	Other

U.S. GOVERNMENT PRINTING OFFICE: 1980--651-112